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PRACTICAL
# WINERY & VINEYARD
MAY/JUNE 2005

*Energy auditing for your winery*

*Vine balance drives grape quality*

*Diacetyl desirability, spoilage and beyond*

*Integrated irrigation Part II*

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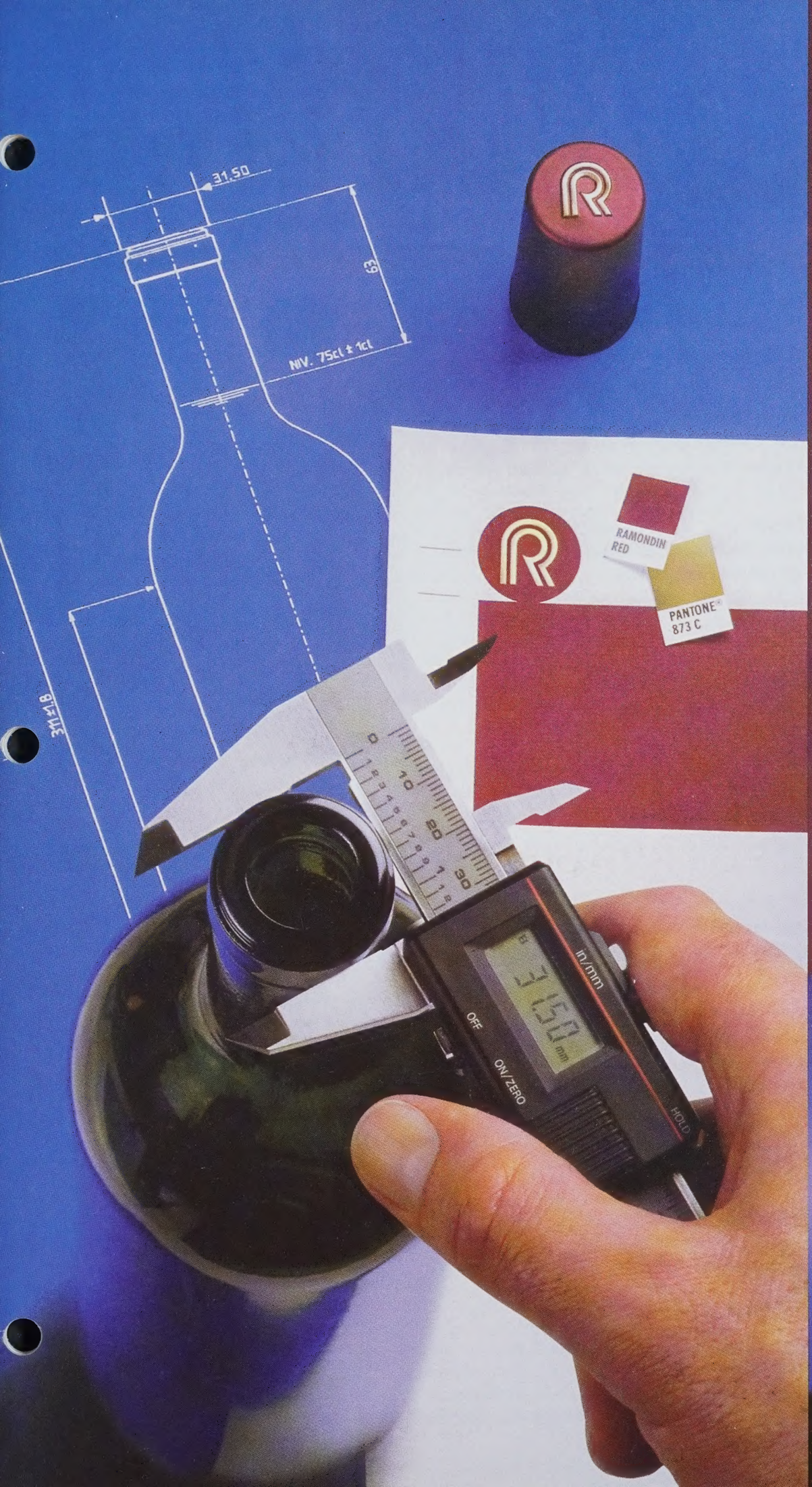


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# PRACTICAL WINERY & VINEYARD

MAY/JUNE 2005 • VOL. XXVII, NO. 2

## CONTENTS

*FREE RUN*

5 **Vote Yes on PD/GWSS referendum**
*By Ben Drake, Jim Richards, Bobby Koch*

*SUSTAINABLE BUSINESS*

6 **Benefits of energy auditing for your winery**
*By John Garn*

*COVER STORY*

16 **Designing biodiverse, pest-resilient vineyards through habitat management**
*By Miguel A. Altieri, Clara I. Nicholls, Luigi Ponti, & Alan York*

31 **WINERY/WHOLESALER RELATIONSHIP — Ten "do's" to increase sales**
*By Michelle Rowell*

*GRAPEGROWING*

36 **Vine balance drives grape quality**
*By Eben Archer & J.J. Hunter*

50 **Buttery attribute of wine — diacetyl desirability, spoilage, and beyond**
*By Eveline J. Bartowsky & Paul A. Henschke*

61 **Integrated irrigation of California winegrapes: Part II**
*By Mark Greenspan*

68 **SHOWCASE**
**WINEMAKING SUPPLIES**

76 **Quality and convenience drive wine packaging innovations**
*By Joel Quigley*

**COVER PHOTO: Insectory at Benziger Vineyard. Photo by Mary Benziger.**

**36 Vine roots and trellis are parts of vine balance.**

## DEPARTMENTS

80 **SUPPLIER GRAPEVINE**
*By Tina Vierra*

81 **SMART VITICULTURE**
**Modern wine pioneers in cold climates**
*By Dr. Richard Smart*

84 **PERSONNEL POINT OF VIEW**
**Can you hear me now?**
*By Anne Heron*

## READER SERVICE

77 **Bookshelf**

78 **CALENDAR**
***2005 ASEV/ES Symposium —***
*By Anna Katharine Mansfield*

***International Cool Climate Symposium for Viticulture & Enology***
*By Glen Creasy*

83 **BOOK EXCERPT**
***Munson's Legacy — Foundations of American grape culture***
*By Sherrie S. McLeRoy & Roy Renfro, Jr.*

87 **Advertiser Index**

*"To stimulate continuing improvement in the wine industry."*

# Vote Yes on PD/GWSS referendum

In just five years, the California wine industry has pulled off a near-miracle. When the newly immigrated glassy-winged sharpshooter (GWSS) first infested California's Temecula Valley in 1999, it created an industry-wide alarm. In just one year, this new sharpshooter had carried Pierce's disease (PD) throughout the region, destroying 40% of Temecula vineyards. And then the pest began moving north. With no cure for PD and no control protocols for GWSS, panic would have been an understandable response. Instead, the industry responded decisively and proactively.

Throughout California, winegrape growers formed alliances to find ways to halt the spread of GWSS and to find a treatment for the Pierce's disease it carried. Given the gravity of the situation, growers and vintners aggressively lobbied for successful enactment of Assembly Bill 1394 in 2001, which established the PD/GWSS Board and the current grower assessment that helps fund critical research into this issue.

Quick reaction, collective efforts, industry/government partnerships and proactive steps taken by the wine community literally saved California's $45 billion wine industry from its greatest natural nemesis since phylloxera.

Now the wine industry is being called upon to display the same foresight and dedication it exercised four years ago, when they supported AB 1394. The new Senate Bill 1650 (approved by the Legislature in the fall of 2004), would continue the assessment and research activities for another five years if supported by enough winegrape growers in the May–June 2005 referendum. The referendum will pass if 65% of those voting yes paid a majority of the assessment in 2004, or a majority of those voting yes paid 65% of the assessment, and at least 40% of eligible growers vote.

Ironically, it may be the very success of the research and control programs that jeopardize their continuation. In the absence of another wave of destruction such as Temecula experienced, growers and vintners may assume the infestation is eradicated and resources can better be dedicated to other issues. Nothing could be further from the truth.

The assessment on all winegrapes grown in California is at the heart of well-funded, effective research and control programs. Growers and vintners from every region of the state sit on the PD/GWSS Board. Their task is two-fold: to ensure that industry funds are being invested wisely on research projects with the greatest promise, and to ensure that pest-containment efforts continue to stop the spread of the infestation.

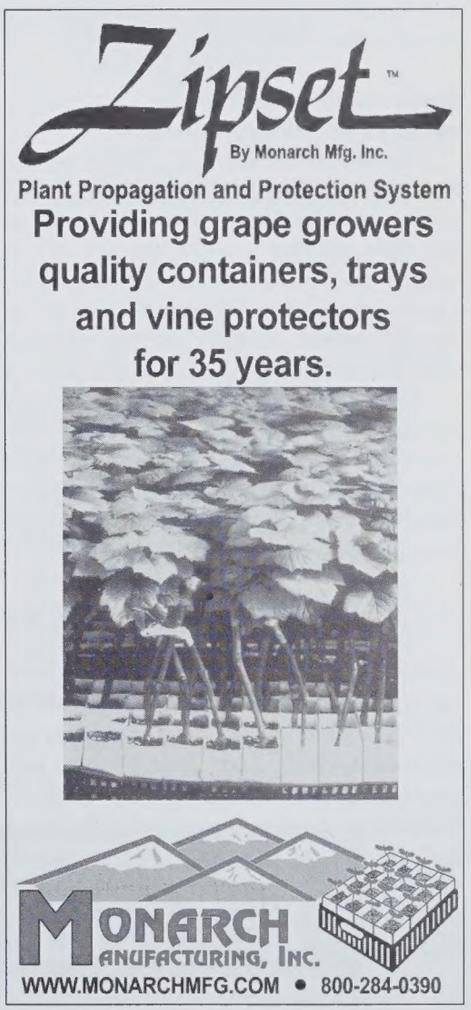
Supported by some of the best scientific minds in the U.S., board-funded research not only is working toward the long-term goal of finding a way to manage PD, but also providing immediate tools in the battle to control the spread of the GWSS. New trapping protocols, sampling procedures, chemical treatments, and parasitic wasps are just some of the outcomes of more than 100 research projects funded by the grower assessment.

Pest containment and research programs would cease if the wine community's funding is discontinued. It is important to realize that the industry's assessment (totaling about $16 million to date) funds only 10% of the research on this issue.

Some may think that is too little to justify continued assessment, but it was the willingness of growers to self-assess that invited state and federal legislators to recognize the severity of this threat and thus provide the bulk of the $160 million in support. Those same legislators, however, have made it clear that ongoing funding in an era of deficits would be unlikely without continued involvement by the grower and vintner community.

State and federal funding that is leveraged by the assessment should not be jeopardized. Voting "yes" on the PD/GWSS Referendum is a vote to protect your vineyard investment. When you consider the losses you would face if the highly-efficient GWSS vector moved into your vineyard and caused Pierce's disease, the assessment should seem like quite a bargain. Return your ballot with the "yes" box clearly marked on this critical issue, and ask your fellow growers to do the same!

*Ben Drake*, Chair, California Association of Winegrape Growers
*Jim Richards*, Chair, Family Winemakers of California
*Bobby Koch*, President, Wine Institute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# Benefits of Energy auditing for your winery

BY John Garn

Understanding energy usage is one of the most difficult aspects of winery operations. It is vital to know what you don't know. The investment of time and money to find and organize all of your energy information may not seem worth it, but ignorance of how you use energy could be costing your winery dearly. To reduce that risk, have a professional do an energy audit at your winery every two years and maintain an ongoing program of self-assessment. In the meantime, let's find out what you don't know by asking a few simple questions.

### How much total energy does your winery consume?

For the moment, let us ignore the energy use of any given motor, drive, and pump. Instead, we want to look at the "big picture" — before we try to target the bulls-eye of specific efficiency measures. We want to develop an awareness of total energy coming into the winery.

For most operational people, energy equals electricity. But energy is often more than that. At the highest bird's eye level, it includes vehicle trips (gasoline), air travel (jet fuel), natural gas, propane, and diesel. This is the total energy consumed by your winery in the production of wine.

For many senior managers, the "big picture" is a dollar amount; they just want to know the total cost of energy usage at their winery. However, we are not talking just dollars here — we are talking kilowatts and BTUs. We have to know those energy numbers before we can determine how much it costs in dollars to produce each case of wine per year.

This is where the energy baseline for the entire winery demonstrates its value. By knowing where we are with current energy use, we can determine where we can go with future energy efficiency measures. This also provides the opportunity to demonstrate cost savings over time.

An often-overlooked aspect of an energy efficiency program is the inclusion of a strategy for reinvesting a percentage of the savings generated from initial efficiency actions. If there isn't any strategy for using a percentage of the captured savings for implementation of future efficiency measures, the money often disappears into the general fund, and any additional requests for capital improvements are harder to justify on a cost/benefit basis.

Once you know the total kilowatts and BTUs per year, and the total number of cases or gallons produced in the same year, you will have the formula to calculate the total kilowatts and BTUs, or "energy intensity," per case or gallon of wine. The selection of gallon or case will depend on your winery operations.

With many wineries outsourcing bottling, having a metric of gallons is more useful. If your facility also bottles, then a case metric might have more meaning. This calculation begins to establish the metric needed to gauge investments for future efficiencies and allows you to ask the next question.

### What are tools for benchmarking energy use?

The baseline number of total energy use (your most important tool) can be computed by your accountant or bookkeeper. They usually have access to the energy bills, but they probably have only been recording the amounts due, and are not tracking the kilowatts or BTUs.

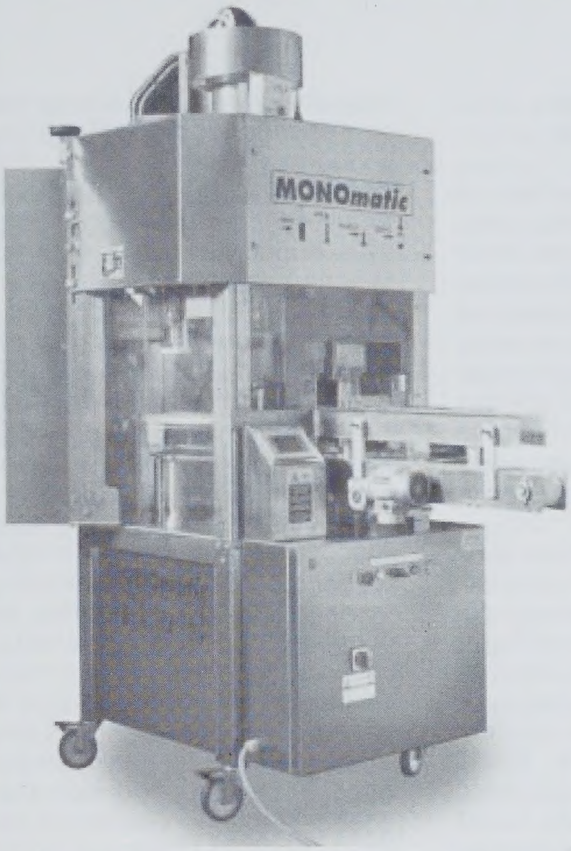
If the operation or facility manager takes on the task of tracking energy use, they can contact the accountant to get the energy bills and then enter the use information into a database. Keeping track of energy usage requires an investment of time and a willingness on the part of the accountant or bookkeeper, along with direction from the owner.

A more efficient tool can be the utility itself. Most, like Pacific Gas & Electric (PG&E, www.pge.com), have online services that allow the energy user to obtain up to three years of his-

**Kunde Winery installed a new 15hp air compressor to replace a 50hp compressor and added a second, larger 2,560-gallon air holding tank to the existing 1,670-gallon tank in 2004. The increased air-holding capacity allows a smaller air compressor to run less often while maintaining a constant pressure.**

*John Garn, founder of ViewCraft LLC, is a whole system consultant working with businesses to imbed the concept of sustainability into the context of their business. He is the developer of the Sonoma Green Business program and a co-author of the Code of Sustainable Winegrowing Practices workbook and the California Wine Community Sustainability Report. John is currently working as a consultant for the California Sustainable Winegrowing Alliance.*

# Winery Processing Equipment & Supplies

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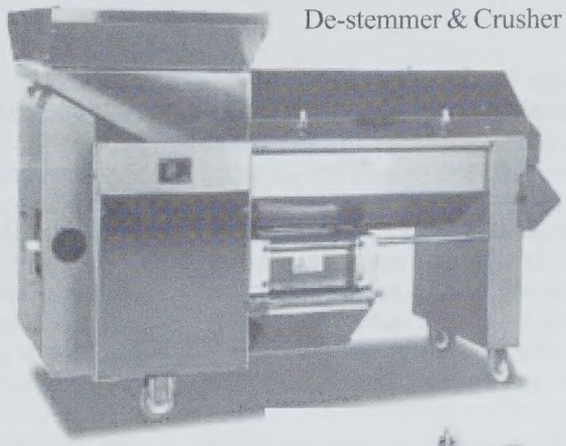
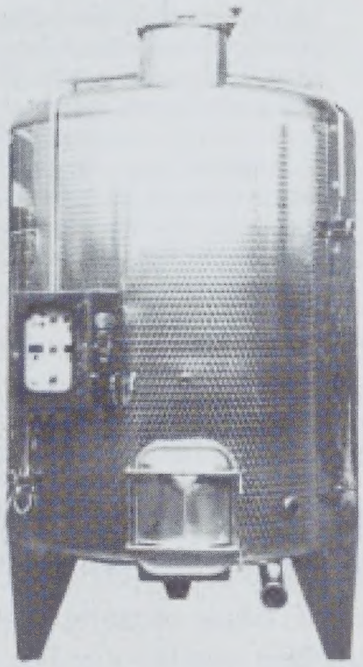
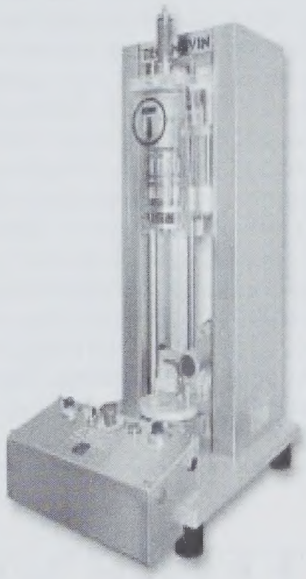


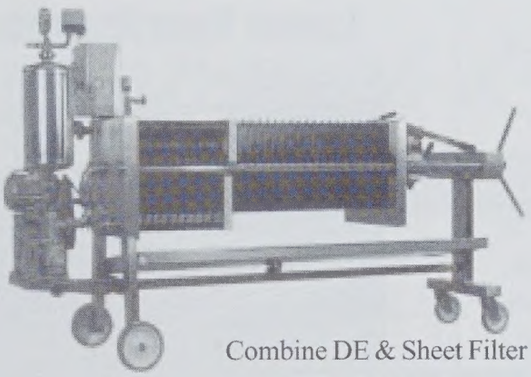
De-stemmer & Crusher



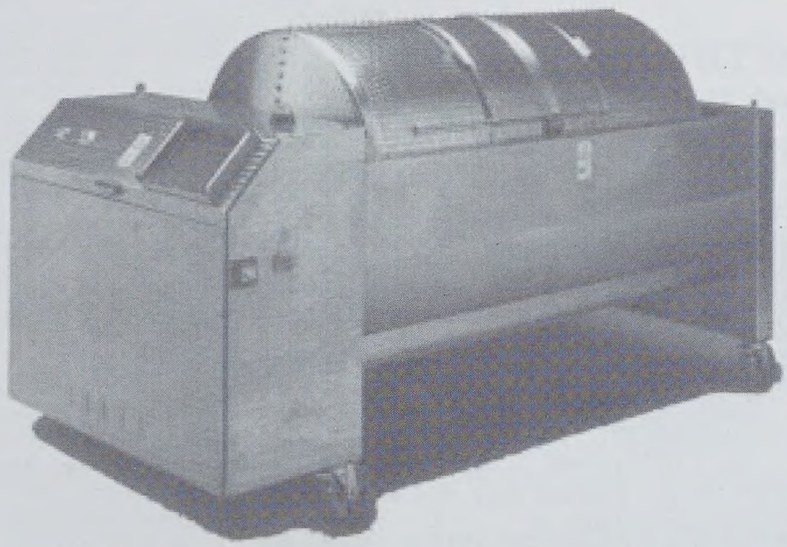
Punch-down Tank



Screwcapping Machine



Combine DE & Sheet Filter



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torical data for their operation. A simple registration form needs to be completed online for this service.

There are several other energy services on the PG&E website at www.pge.com/biz. You can request net year-to-date information, usage over comparative years, per-meter usage, and complete account information. This is the easiest and most cost-effective way to understand total energy use of your winery.

Another tool that is just becoming available for wineries is interactive software developed by Lawrence Berkeley National Laboratories (Berkeley, CA) and Fetzer Vineyards (Hopland, CA). The Benchmarking and Energy and Water Savings Tool (BEST) winery software is free and is being distributed at workshops in California. It was developed because the wine industry is the second largest user of electricity in the California food industry. (See sidebar, page 10).

***How does your total energy number compare with other wineries?***

Once you have the big numbers on energy use, you need to gain additional perspective on just what those numbers mean. Many wineries believe that they are very energy-efficient, but not many know their energy-intensity per case or gallon. It is not easy to compare with other facilities to see whether your operation is as energy-efficient as you perceive, or if you are spending three times more on energy per case or gallon than other wineries.

The new BEST software (see sidebar) will provide the ability to compare your operation with a very energy-efficient "reference" winery. This will give you a benchmark against the best winery in energy- and water-efficiency.

Another way to gain a broader perspective is to talk to the PG&E specialist who does energy-efficiency walk-throughs. He will have heard from all of the wineries he is working with about their total energy use per case or gallon of wine. He will have a good idea of a "general" industry average even though no official metric exists. In addition, perhaps your own contacts at other wineries can give you an accurate metric for their energy use.

A comparison of your total energy-intensity is available through a sustainable practices assessment that is free to any California winery that participates. The statewide program, the *Code of Sustainable Winegrowing Practices,* is a workbook that includes a chapter on energy efficiency (with a criteria list, see Table I) that has 11 practices to be assessed by any participating winery or vineyard. Simply submit your assessment, and then receive a customized report showing your scores in relation to other wineries in your county, and to all participating California wineries. To date, more than 100 wineries are in the assessment data set. For a listing of upcoming workshops

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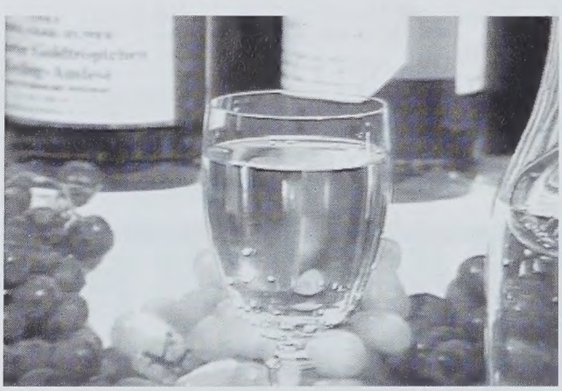

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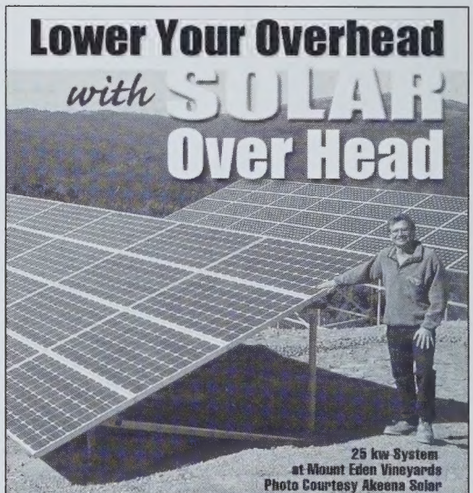

25 kw System at Mount Eden Vineyards
Photo Courtesy Akeena Solar

"As a businessman, the estimated cost savings over the life of the system – made the decision a no-brainer. What we didn't realize was the PR value. We've been receiving calls from all over the country complimenting us for putting in the solar power system and asking how they can buy our wine!" – *Jeffrey Patterson, Owner Mount Eden Vineyards, Saratoga, CA*

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***What are the biggest users of energy at your winery?***

A detailed energy audit will complement your benchmark by adding detail to what you already know about overall energy use at your winery, and acting as a test of your perception of your winery's energy efficiency. An energy audit is useful to identify the aspects of winery operations, or pieces of equipment, that are using the largest amounts of energy, or using energy most inefficiently.

These energy hogs are also known as the "low-hanging fruit." This "fruit" is often associated with boilers, refrigeration, compressors, and lighting, and it can be dropped in numerous ways.

An often overlooked area to consider when looking for low-hanging fruit is the water system. Water can be a big energy user, and each gallon of water has a specific unit of energy associated with it. Pumps are required to extract water out of the ground to make it available for the winery, and to irrigate vines and landscaping. Large amounts of energy are used to heat it, deliver it to the appropriate area, treat it, and dispose of it.

An especially large energy user is the aerators in wastewater ponds, which often run around the clock. Reducing the amount of water used in the winery can play a significant role in overall energy-efficiency plans for any facility.

***Resources***

It is best to leverage experience when possible, and the BEST software tool comes with a PG&E specialist who can visit your facility for a "walk-through." You can initiate this process by contacting PG&E via phone or email. A walk-through will provide several options for pursuing energy efficiency:

1. Equipment review and rebate availability. This is the simplest walk-through. It focuses on major equipment, with rebate information where appropriate.
2. No-cost measures. This visit expands the audit to include lights being left on and air compressors left running. These simple behavioral changes can promote immediate efficiencies and savings, but they do require persistence and commitment on the part of management if the changes are to become permanent.
3. Low-cost measures. These measures include actions that have a 12-month payback or less. They might include changing high-bay mercury lights to T5 fluorescents or installing motion detectors.
4. Investments. These measures require an investment that has a longer payback but can save large amounts of money over time. They include actions such as variable speed drives and tank insulation.

With a walk-through by a PG&E specialist, you will be able to select the level of information and detail that you want for your winery. The specialists are trained to help you understand the energy use of all equipment, help you identify the "low-

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hanging fruit" to drop, and suggest the best approach to dropping it. They can help you develop an energy conservation plan, to leverage early savings for the next set of improvements.

For a complete set of PG&E's business tools go to: www.pge.com/biz/biztools.html.

PG&E also offers energy efficiency workshops specifically for the agriculture sector. For a listing of upcoming workshops in your area, go to www.pge.com/pec.

In addition, PG&E offers several rebate programs to help you with the cost of new lighting, compressors, pumps, and motors (see "Rebates for energy-efficient wineries," *PWV*, September/October 2004). To get the overall picture of available services and rebates available from PG&E, contact

## New free software helps wineries increase efficiency

How it works and where to obtain it.

California wineries now can obtain "BEST Winery," an easy-to-use, computer-based tool and handbook to help reduce energy and water costs, thanks to researchers at the Department of Energy's Lawrence Berkeley National Laboratory, who worked with Fetzer Vineyards.

BEST (Benchmarking and Energy and Water Savings Tool) Winery incorporates information about how energy and water is used in each step of wine production, based on key characteristics entered by a user. Winery personnel can enter data such as location, climate of vineyards, tons of grapes and juice received, and amount of wine produced, stored, and/or bottled.

The BEST reference winery is based on a very efficient winery model with the same characteristics as the user winery. But the reference winery uses state-of-the art, commercially available energy- and water-efficient technologies.

BEST Winery provides an interactive menu of over 100 opportunities for improvement. BEST Winery contains efficiency opportunities for water, refrigeration, pumps, compressed air, motors, lighting, hot water production, cogeneration, and other applications. Best of all, the free software is built for use by small to medium-size wineries.

With support from Pacific Gas & Electric, three free training sessions were held in May 2005 to introduce the tool, and train winery staff to use the BEST Winery software.

After June 1, to obtain a copy of the software, contact: www.LBNL: ies.LBL.gov/iespubs/ievapubs.html or www.energy.ca.gov/pier/iaw/index.html. ■

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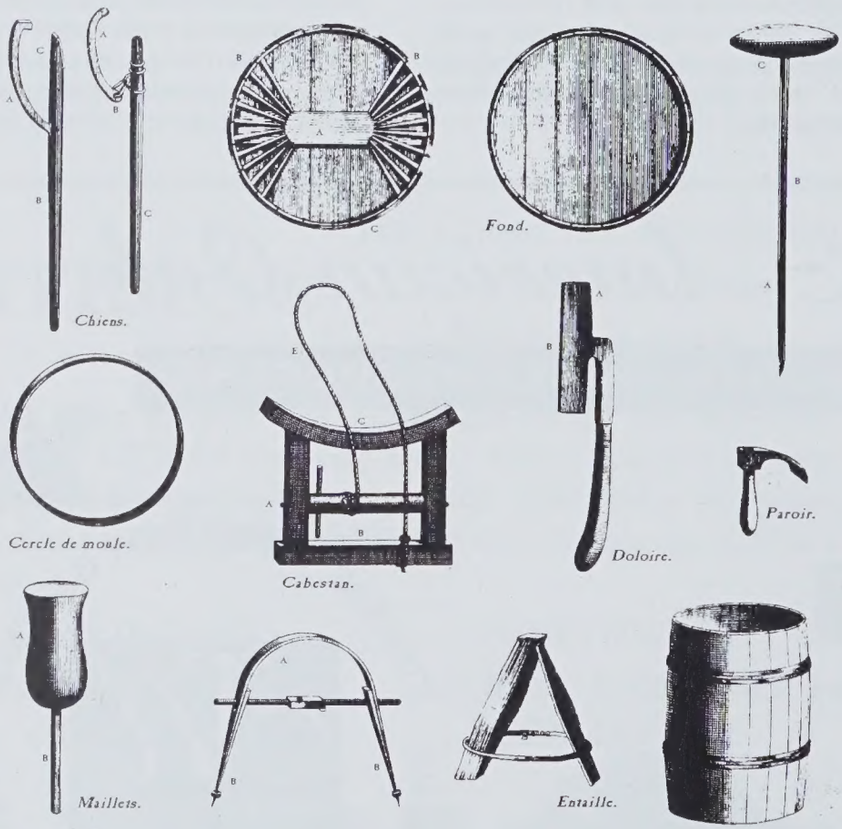


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Another useful resource for audits can be universities. Many universities have classes that are researching energy efficiency, with students in search of an interesting project. Students at Sonoma State University (SSU, Rohnert Park, CA) and San Francisco State University (SFSU) have conducted detailed energy audits for wineries.

These studies provide very useful information, give students hands-on experience, and require no capital outlay from the winery. Maybe most important of all, these audits get operation managers thinking about how much energy their facilities are using and of ways to be more energy-efficient.

Finally, companies wanting to help you with your energy efficiency may provide auditing services as part of their "bid" for services. There are two kinds of companies providing these services. First are those specializing in energy efficiency. These are professional engineers who do audits for a living. The second kind is equipment suppliers, who will conduct an audit to identify inherent savings available if you select their product(s).

For example, if you are thinking about insulating tanks, but you don't know whether it makes economic sense, a company specializing in tank insulation can come in, review your energy use and calculate costs on tank insulation. The more equipment the company provides, the more detailed an audit they will provide up front.

Another overlooked resource is other wineries. The network of wineries that are very proactive about energy efficiency and are investing in renewables is growing, with new solar installations (Rodney Strong Vineyards, Healdsburg, CA), solar thermal (J Wine Company, Healdsburg, CA), and methane digestors (Clos du Bois, Geyserville, CA) among projects in recent years, plus solar installations at Evergreen Valley Winery (Lutherburg, PA) and Stargazers Vineyard (Coatesville, PA).

Other wineries are implementing energy efficiency measures that are easily replicated, such as connecting dissolved oxygen monitors to wastewater pond aerators (Beringer Blass Wine Estates, St. Helena, CA); use of frequency-drives on pumps, crush operations, and bottling lines (Jordan Winery, Geyserville, CA); and changing lighting from T12s to T8s (Kunde Estate Winery, Kenwood, CA). Getting in touch with the facility and operation managers of these wineries can provide a wealth of information. Perhaps most beneficial of all, they might share with you what, if anything, they would do differently if they were to do the project over again. This kind of experience does not have a price tag.

### *Winery self-audit checklists*

Wineries can employ self-audits to begin to realize immediate energy savings. Several examples of a self-audit

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checklist can be found online (**see Table I**).

There is no energy audit checklist that is specific to wineries. A general energy analysis can be helpful if you are just getting underway with energy efficiency.

To complete an online Business Energy Analysis from PG&E go to www.pge.com/biz/energy_tools_resources/energy_audit/index.html. This will help you reduce your energy bill, improve the productivity and comfort of customers and employees, obtain information about incentive programs, and improve your bottom line.

**Table I:**
**List of energy-efficiency criteria***

1. Planning, monitoring, goals and results,
2. Refrigeration system,
3. Tanks and wine-transfer lines,
4. Motors, drives and pumps,
5. Heating, ventilation and air conditioning (HVAC),
6. Lighting — offices and lab,
7. Lighting — shops and facilities,
8. Lighting — outdoor and security,
9. Office equipment,
10. Alternative sources of power,
11. Alternative fuel sources — vineyards

* From Wine Institute/California WineGrape Growers Sustainability Workbook, Chapter 9

If you are going to prepare a self-audit, it is important to include both behavioral and technical changes. There are many examples of technology being purchased but not used effectively, so the estimated savings just never materialize.

Behavioral changes are especially useful after developing the big picture and performing a winery self-audit. Something as simple as cleaning light fixtures as part of general maintenance can enhance efficiency. This can be the easiest thing to recommend to staff — and the hardest thing for them to adopt.

"Employees are the biggest factor, because when they fully understand energy efficiency, the spark of innovation ignites and all kinds of ideas get generated," says Matt Atkinson, ranch manager of Benziger Family Winery (Glen Ellen, CA). "Employees are really the biggest factor in energy efficiency because they are doing the work, so they have a better perspective on how to improve things in their operation area."

One useful tool is an employee bulletin board where information can be posted. This is a great way to obtain feedback from employees about the total energy use of the winery. Asking for feedback can bring energy use to the awareness of everyone, so that behavior change gets reinforced and becomes part of the winery culture.

Technology changes can be very low-tech. They might include the addition of window film to reduce solar heat gain, or making sure that glycol lines and hot water pipes are insulated. They could be easy-to-do measures, like installing motion detectors and using natural light-

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ing, which can begin to save money and provide energy security with very little initial investment.

Efficiency changes can also involve more advanced technology, such as the use of refrigeration jackets for white wine fermentation, or equipping tanks with reset controls.

**(See the Self-Audit Starter List, page 15.)**

### *Case studies*

Benziger Family Winery was audited by Sonoma State University in 1999 using the baseline of 1998 energy use. "The Living Machine" (a wastewater technology) was in use at a brewery that is now the site of the family's Imagery Estate Winery. Several students volunteered to operate the Living Machine, and one student approached ranch manager Atkinson about conducting an energy audit for the winery. The audit was very detailed, looking at the wattage of everything from the refrigeration system to the phone answering machine.

While the final report was overwhelming at first, Atkinson was able to get the "big picture" of total energy use. "The report allowed us to focus on the low hanging fruit, which was the lighting system," says Atkinson. Replacement with energy-efficient fixtures was the first post-audit project.

In 2003, Benziger rebuilt the entire crush pad area. Efficiency improvements included insulating tanks and putting foam insulation in the barrel barn ceiling. The 2005 project is to incorporate 480 voltage throughout older buildings to allow more efficient use of electricity and better operation of variable-speed drives.

Atkinson now tracks electrical and water use monthly, and uses the energy report to refresh his memory about equipment use, as he gets ready to replace worn-out equipment with more efficient equipment. Benziger has been able to reduce energy use by over 20%.

Kunde Estate Winery was audited by San Francisco State University students in summer 2004 when assistant winemaker Andy Willbanks agreed to participate in a U.S. Department of Energy (DOE)-sponsored program offering energy efficiency services to wineries at no cost. The DOE audits are a detailed look at all equipment and electronic devices at a facility; they also include a comprehensive waste audit.

The audit was led by SFSU Engineering Department faculty with assistance from graduate students, who provide the winery with a detailed report identifying the best measures to save money and increase energy-efficiency.

The SFSU auditing team was also available to the winery after the report is completed to answer questions and provide expertise during future implementation of their recommendations. The report is thorough enough to be used by engineering firms that wineries later retain to implement large efficiency projects.

It seems that there is no downside to working with students. All that is required is time to coordinate the project, provide energy and waste bills for the benchmark period, and give a

## Lighting efficiency and the SBEA

The Small Business Energy Alliance (SBEA) is a limited resource program sponsored by the California Public Utilities Commission to assist small companies in California.

For businesses using under 500kW per meter per account, the SBEA offers assessment of lighting systems, thermostats, and small refrigeration units (though not winery-scale HVAC and refrigeration systems). The program also has some funds to help businesses upgrade or replace such systems with more efficient ones.

In 2003 and 2004, the SBEA helped Cline Cellars (Sonoma, CA), and the Valley Wine Warehouse (Napa, CA) replace metal halide lighting with high-output T-5 lamps and motion sensors. Sonoma County program manager Ken Moore says the SBEA would love to work with more small wineries to increase efficiency.

The SBEA can be found online at www.sbeaonline.com, or at the "Program hotlines": 888/759-9800 (southern CA), and 800/881-SBEA (northern CA).

**STARTER LIST**

## Winery self-audit questions

In assessing your winery for eco-efficiency opportunities to implement, keep in mind that this is not a "one size fits all" program, and it is not necessary to try and do them all. This self-audit is meant to promote thinking and point you in the right direction.

It is encouraged that winery executives or operations managers do self-audits with winery personnel who may have important information to contribute. In addition to getting a better picture of the winery, everyone will be on the same page as you move forward.

What is total energy use per year?

What is total use of electricity? natural gas? propane? diesel? other?

What is total wine production (in gallons or cases)?

What is the energy-intensity per gallon or case?

Has the winery had an energy-audit in the past two years?

If yes, where is the information?

If not, why not?

Is there a regular maintenance cycle for heating, ventilation, air-conditioning (HVAC)?

If so, what is regular maintenance cycle?

If not, what is efficiency of the HVAC?

Are HVAC thermostats set for proper temperature (such as 65°F in winter, 78°F in summer)?

Is there a policy to turn off lights and machinery when not in use? If yes, is it being followed?

What kind of lighting is used in offices and winery? How effective is natural lighting being used?

Are tanks insulated?

Are glycol lines insulated?

Are hot water pipes insulated?

When was the last time the compressed-air system was checked for leaks?

Were any leaks found? If yes, were leaks repaired?

Is there enough air-holding capacity to reduce compressor-run time?

How old is the refrigeration equipment, air compressor(s), and boiler(s)?

Are the wastewater aerators operated around the clock, or regulated by timers?

If not, what is frequency of operation?

Is office equipment *Energy Star*-certified for efficiency?

facility tour. The total time investment is about six to 10 hours for the winery.

Willbanks completed implementation in 2004 of the first of six recommendations — air compressor modifications. A 50hp compressor was replaced with a 15hp compressor (reducing run-time of the compressor) and an additional holding tank installed (ensuring there is enough pressure when needed) for bladder inflation on two membrane presses, for air pumps in the cellar, and the bottling line.

Kunde Winery is replacing T12 lights with T8 lights. Willbanks uses the report to help him plan the efficiency implementations, and will continue with more recommendations. Three other recommendations are: install energy-efficient motor when a burned out motor needs replacement; augment or replace existing insulation on chiller lines; and optimize refrigeration system compressor head pressures.

For more information about SFSU DOE winery audits, contact Ahmad Ganji at 415/338-7736 or email: aganji@sfsu.edu.

### *Conclusion*

The goal of energy audits is to identify ways to increase energy efficiency and to save money. But it is also to educate you and your staff about the total energy use, get everyone thinking about where energy is being wasted, and provide you with the opportunity to identify the most valuable questions to ask energy experts. It also makes you a smarter equipment shopper.

Remember, finding answers is not necessarily the most cost-effective strategy. Knowing the most valuable questions to ask, and knowing whom to ask, can often be worth a lot more. ■

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One acre insectory at Benziger Vineyards. (Photo by Mary Benziger.)

# Designing biodiverse, pest-resilient vineyards through habitat management

BY Miguel A. Altieri, Clara I. Nicholls, Luigi Ponti, Alan York[2]
ESPM-Division of Insect Biology
University of California, Berkeley
[2]Wholistic Estate Management

Most typical California winegrape production is done in monocultures, that totaled 568,000 acres in 2002 (although this acreage decreased slightly in 2003/2004), an agricultural expansion that is slowly resulting in the simplification of large landscapes. Since the onset of such simplification, farmers and researchers have been faced with a major ecological dilemma arising from the homogenization of vineyard systems: increased vulnerability of uniform, large-scale monocultures to insect pests and diseases, which, in many cases, can cause yield losses.

Expansion of monocultures has decreased abundance and activity of natural enemies due to removal of critical food resources and overwintering sites. Many scientists are concerned that, with accelerating rates of habitat removal, the contribution to pest suppression by biocontrol agents using these habitats will decline. It is possible that many pest problems affecting today's vineyards have been exacerbated by such trends.

About 69 million lbs of active ingredients of pesticides are used annually in California vineyards to counteract such pest pressure, especially diseases as much of the chemical inputs comprise applications of sulfur dust. The environmental impact of such pesticide load can be serious.

Concerned about these problems, many people have proposed options to rectify this habitat decline by increasing the vegetational biodiversity of agricultural landscapes. There are many ways in which increased plant biodiversity can contribute to the design of insect pest-stable agroecosystems by creating an appropriate ecological infrastructure within and around vineyards. A key feature of that infrastructure are flower resources which can be provided in the form of cover crops, corridors, or islands.

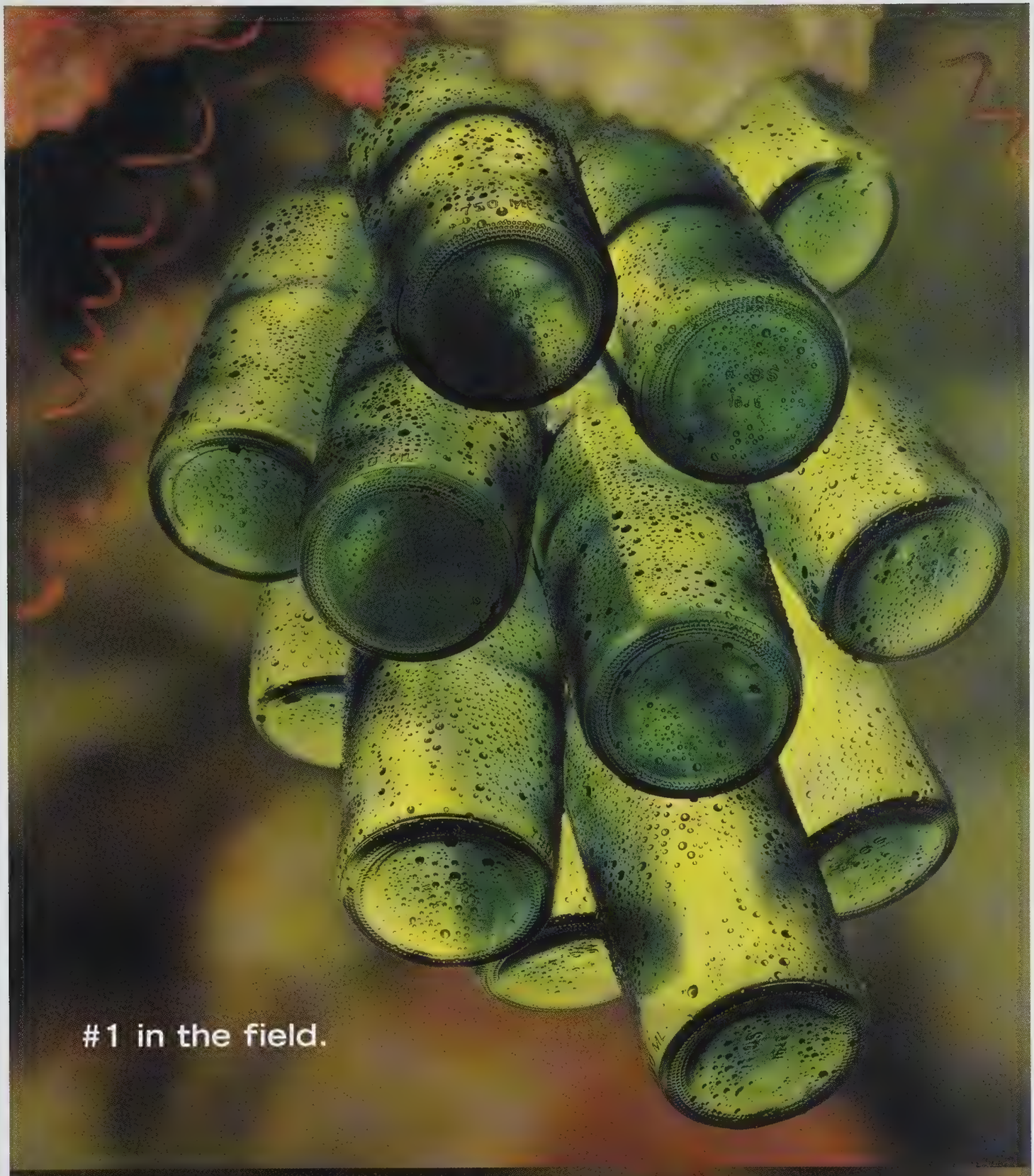
When choosing flowering plants to attract beneficial insects, it is important to note the size and shape of the blossoms, because that is what dictates which insects will be able to access the flowers' pollen and nectar. For most beneficials, including parasitic wasps, the most helpful blossoms should be small and relatively open. Plants from the Compositae (sunflower) and Umbelliferae (carrot) families are especially useful.

Timing of flower availability is as important to natural enemies as blossom size and shape. Many beneficial insects are active only as adults and only for short periods during the growing season; they need pollen and nectar during these active times, particularly in the early season when prey are scarce. One of the easiest ways growers can help is to provide beneficials with mixtures of plants with relatively long, overlapping bloom times.

Biodiversity is crucial to crop defenses: the more diverse the plants, animals, and soil-borne organisms that inhabit a farming system, the more

Adult *Anagrus epos* male, parasite of the grape leafhopper. (Photos by Jack Kelly Clark for UC Statewide IPM Project. ©2000 Regents, University of California.)

Adult female wasp, *Anagrus epos*. (57x magnification)

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diverse the community of pest-fighting beneficial organisms (predators, parasitoids, and entomopathogens) a farm can support.

Farmers can enhance biodiversity on their farms by:

1. Increasing plant diversity with crop rotations or with "polycultures" (crop mixes) of cash crops grown on the same vineyard land at the same time;
2. Planting cover crops between vines;
3. Managing vegetation surrounding fields to meet the needs of beneficial organisms;
4. Designing corridors of plants that usher beneficials from nearby forests or natural vegetation to field centers;
5. Selecting non-crop plants grown as strips in fields, whose flowers match beneficials' requirements;
6. Preserve mosaics or islands of native vegetation within or near the vineyards.

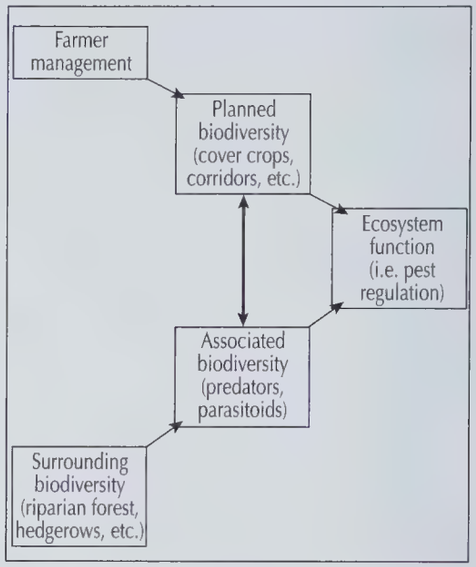
Farmer management
Planned biodiversity (cover crops, corridors, etc.)
Ecosystem function (i.e. pest regulation)
Associated biodiversity (predators, parasitoids)
Surrounding biodiversity (riparian forest, hedgerows, etc.)

**Figure 1. Relationship between several types of biodiversity and their role in pest regulation in a diversified vineyard.**

All the above strategies provide alternative food (pollen and nectar) and refuge for predators and parasitoids of leafhoppers, mites and lepitodpterous pests, thereby increasing natural enemy diversity and abundance in vineyards.

### *Biodiversity in vineyards and its function*

Biodiversity in vineyards refers to all plant and animal organisms (crops, native vegetation, weeds, livestock, natural enemies, pollinators, and soil flora and fauna) present in and around farms. How diverse the vegetation is within and around a farm, how many cover crops are grown, how close a vineyard is to a forest, hedgerow, meadow, or other natural vegetation, are all factors that contribute to a vineyard's level of biodiversity.

Two distinct components of biodiversity can be recognized in agroecosystems. The first component, *planned biodiversity*, includes the crops and other plants purposely included in a vineyard by a grower. The second component, *associated biodiversity*, includes all soil flora and fauna, herbivores, carnivores, and decomposers,

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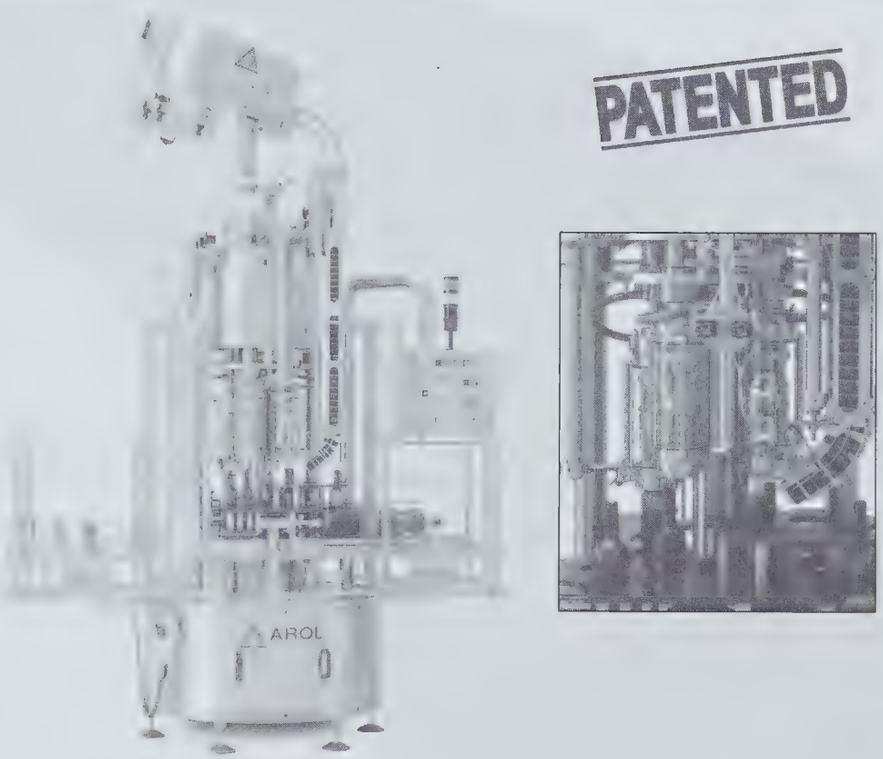


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that colonize the agroecosystem from surrounding environments and will thrive in a vineyard, depending on its management and structure. The relationship of both types of biodiversity components is illustrated in Figure I.

Planned biodiversity has a direct function, as illustrated by the bold arrow connecting the planned biodiversity box with the ecosystem function box (Figure I). Associated biodiversity also has a function, but it is mediated through planned biodiversity. Thus, planned biodiversity also has an indirect function, which is realized through its influence on the associated biodiversity.

For example, cover crops enrich the soil which helps vine growth. The direct function of cover crops is to enhance soil fertility and soil structure.

Along with cover crops come wasps (many moving in from riparian forests) that seek out the nectar in the cover crop's flowers. These wasps, in turn, are natural parasitoids of pests that normally attack vines. Wasps are part of the associated biodiversity, some of which live in the riparian vegetation and move from there to vines or cover crops. The cover crops, then, enrich the soil (direct function) and attract wasps (indirect function).

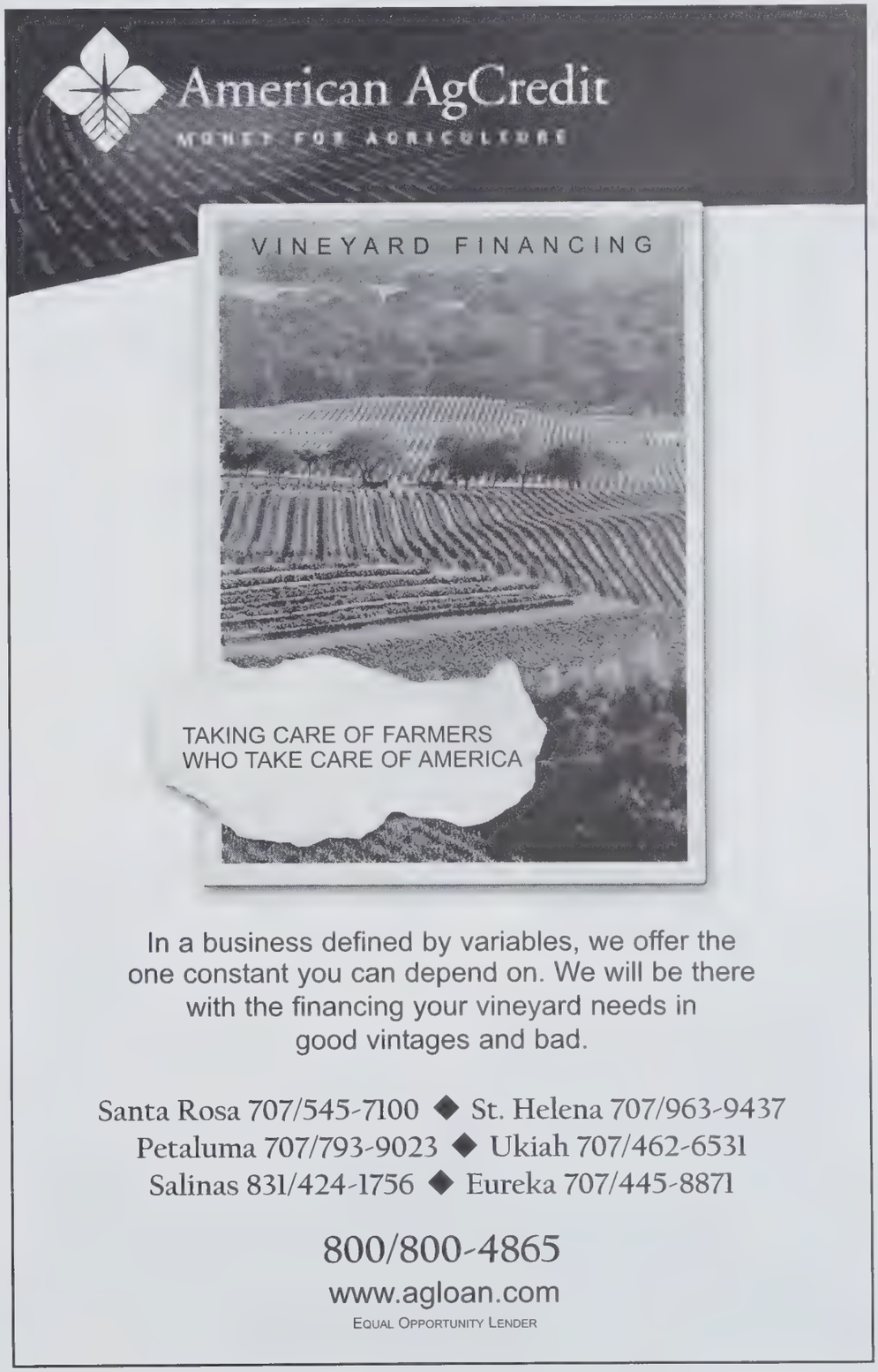
The challenge for growers is to identify the type of biodiversity that is desirable to maintain and/or enhance in their vineyard in order to carry out specific ecological services (such as pest regulation) and then determine the best practices that will encourage such biodiversity. Cover cropping and creation of habitats within vineyards are key strategies.

### *Enhancing vineyard biodiversity with cover crops*

In California, many growers manage resident vineyard floor vegetation or plant cover crops as habitat management to enhance natural enemies. Reductions in mite and grape leafhopper populations have been observed in cover cropped systems.[2,4] But in many cases, such biological suppression has not been sufficient from an economic viewpoint.[3] Usually the problem is that most growers plant winter cover crops and/or allow weedy resident vegetation which are mowed or plowed under at the beginning of the growing season, mainly to avoid competition with the vines for water.

In early summer, these vineyards become virtual monocultures without floral diversity. It is important to maintain a green cover during the entire growing season in order to provide habitat and alternate food for natural enemies, especially in areas affected by grape leafhoppers.

One approach is to sow summer cover crops that bloom early and throughout the season, thus providing a highly consistent, abundant, and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well-dispersed alternative food source, and micro-habitats, for a diverse community of natural enemies. Such food supply decouples predators and parasitoids from strict dependence on grape herbivores, allowing an early build-up of natural enemies in the system, which helps keep pest populations at acceptable levels.

Maintaining floral diversity throughout the growing season in a Northern California vineyard near Hopland in the form of summer cover crops of buckwheat and sunflower, the abundance of grape leafhoppers and western flower thrips was substantially reduced as associated natural enemies increased.

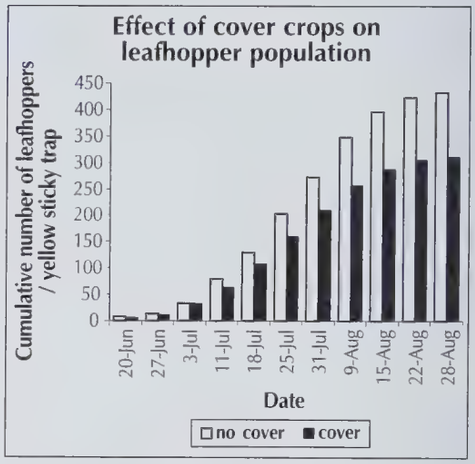


**Figure II. Densities of adult leafhoppers *E. elegantula* in cover-cropped and monoculture vineyards in Hopland, CA, during 1997 growing season.**

During two consecutive years (1996–1997), vineyard systems with flowering cover crops were characterized by lower densities of leafhoppers nymphs and adults (Figure II). Thrips also exhibited reduced densities in cover-cropped vineyards in both seasons.[7]

During both years, general predator populations on the vines were higher in the cover-cropped sections than in the monoculture blocks. Generally, populations were low early in the season, but increased as prey became more numerous as the season progressed. Dominant predators included spiders (mainly salticid [jumping spider] and thomisid species [crab spider], *Nabis* sp. [damsel bugs], *Orius* sp. [Minute pirate bug], *Geocoris* sp. [Big eyed bugs], Coccinellidae [ladybugs] , and *Chrysoperla* sp. [lacewings]).

Although *Anagrus epos* (the most important leafhopper parasitoid wasp), achieved high numbers and inflicted noticeable mortality of grape leafhopper eggs, this impact was not substantial enough. Apparently the wasps encountered sufficient food resources in the cover crops and few moved to the vines to search for leafhopper eggs, especially when eggs are not abundant and despite the presence of leafhopper honeydew. For this reason, alternate tractor row cover crops were mowed to force movement of *Anagrus* wasps and predators into the vines.

Before mowing, leafhopper nymphal densities on vines were similar in all the selected cover-cropped rows. One week after mowing, probably due to increased

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predation, numbers of nymphs declined on vines where the cover crop was mowed, coinciding with an increase in *Anagrus* densities in mowed cover crop rows. During the second week such decline was even more pronounced (Figure III).

The mowing experiment suggests a direct ecological linkage, as mowing cover crop vegetation forced movement of the *Anagrus* and predators harbored by the flowers, resulting in a decline of leafhopper numbers on vines adjacent to the mowed cover crops (in both years). Timing of mowing must coincide when eggs are present on vine leaves in order to optimize the efficiency of arriving *Anagrus* wasps.

### *Designing corridors*

Several studies indicate that the abundance and diversity of entomophagous (insect-eating bugs) insects within a field is dependent on the plant species composition of the surrounding vegetation, and also on the spatial extent of its influence on natural enemy abundance, which is determined by the distance to which natural enemies disperse into the crop.

The role of riparian habitats and especially of wild blackberry patches near vineyards in enhancing the effectiveness of *A. epos* in parasitizing the grape leafhopper is well known.

Based on this knowledge, researchers established that French prunes adjacent to vineyards could also serve as overwintering sites for *A. epos* and found higher leafhopper parasitism in grape vineyards with adjacent prune tree refuges.[8] However, the effect of prune refuges is limited to only a few vine rows downwind and *A. epos* exhibited a gradual decline in vineyards with increasing distance from the refuge. This poses an important limitation to use of prune trees, as the colonization of grapes by *A. epos* is limited to field borders leaving the middle rows of the vineyard void of biological control protection.

To overcome this limitation, the owners of an organic farm near Hopland, CA, established a 600-meter corridor containing at least 65 flowering species, which was connected to a riparian forest and cut across the vineyard. The idea was that such a corridor would serve as a biological highway for movement and dispersal of predators and parasitoids (especially *Anagrus* wasps) into the center of the vineyard.

Movement by natural enemies from nearby habitats to disperse readily within crops, theoretically enhances the speed with which a numerical aggregative response to pest foci may take place.

Data collected within the corridor in the 1996 and 1997 growing seasons showed that species such as *Chrysoperla carnea, Orius* sp., *Nabis* sp., *Geocoris* sp., and several members of the families Coccinellidae, Syrphidae (hover flies), Mordellidae, and some species of

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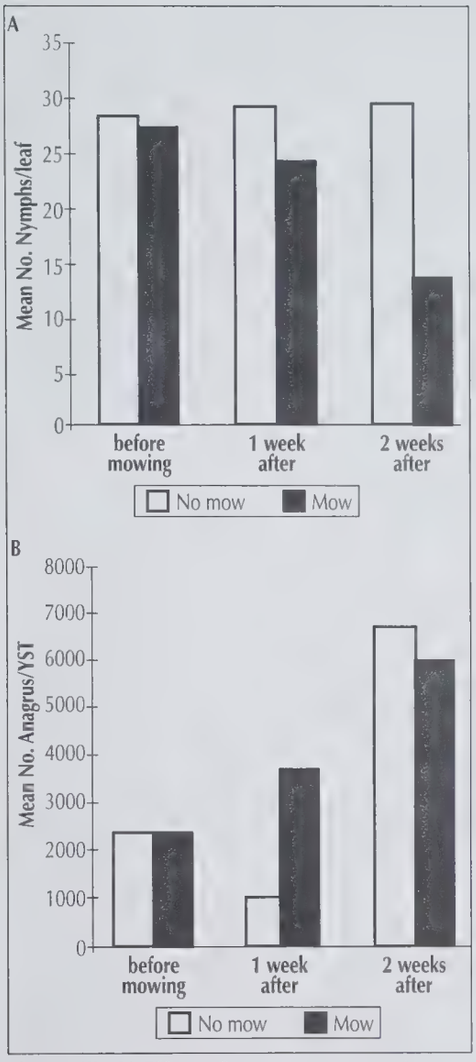


**Figure III. A) Effect of cover crop mowing in vineyards on densities of leafhopper nymphs during the 1997 growing season in Hopland, CA. B) Effects of cover crop mowing in vineyards on densities of Anagrus epos during the 1997 growing season in Hopland, CA.**

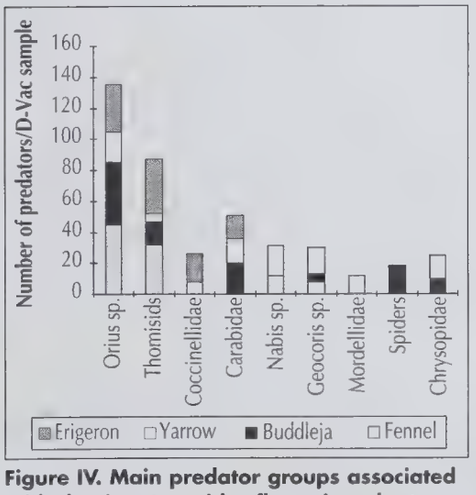


**Figure IV. Main predator groups associated with dominant corridor flowering plants (Hopland, CA 1996).**

thomisid spiders, to be predators commonly found on flowers of the dominant corridor plants such as fennel (*Foeniculum vulgare*), yarrow (*Achillea millefolium*), *Erigeron annuus* and *Buddleja* spp.

Certain predator species moved from the riparian forests, using the resources of the corridor as they were continuously found associated with specific flowering plants (Figure IV), and many of them moved into the adjacent vineyard.

The flowering sequence of various plants species provided a continual source of pollen and nectar, and a rich and abundant supply of neutral insects (non-pestiferous herbivores) for the various predator

**alchemy:** (n.) 1. An imaginary art. 2. A medieval chemical philosophy. 3. The seemingly magical power or process of transmuting something common into something precious.

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species, thus allowing the permanence and circulation of viable populations of key predator species within the corridor.

In both years, adult leafhoppers exhibited a clear population density gradient reaching lowest numbers in vine rows near the corridor and increasing in numbers towards the center of the field. The highest concentration of adult and nymphal leafhoppers occurred after the first 20 to 25 rows (30 to 40m) downwind from the corridor (Figure V). A similar population and distribution gradient was apparent for thrips. In both years, thrip catches were substantially higher in the central rows than in rows adjacent to the corridor.

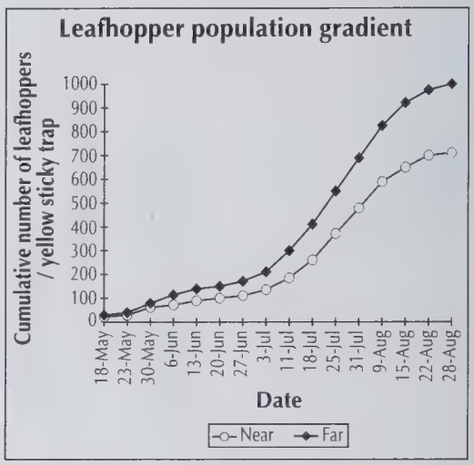


**Figure V. Seasonal patterns of adult leafhoppers in vineyard near and far from the corridor (Hopland, CA 1996).**

The abundance and spatial distribution of generalist predators in the families Coccinellidae, Chrysopidae, Nabidae, and Syrphidae was influenced by the presence of the corridor which channeled dispersal of insects into adjacent vines (Figure VI). Predator numbers were higher in the first 25 meters adjacent to the corridor which probably explains the reduction of leafhoppers and thrips observed in the first 25 vine rows near the corridor.

The presence of the corridor was associated with the early vineyard colonization by *Anagrus* wasps but this did not result in a net season-long prevalence in leafhopper egg parasitism rates in vine rows adjacent to the corridor. Despite the fact that the vineyard had a flowering cover crop, the proportion of eggs parasitized tended to be uniformly distributed across all vine rows in both blocks. Eggs in the center rows had slightly higher mean parasitization rates than eggs located in rows near the corridor.

*Anagrus* does not have the same pollen and nectar needs that many other general predators and parasitic wasps have and apparently does not need a diversity of hosts (neutral insects) for its population to be maintained, constituting an exception in this regard. Despite the fact that *Anagrus* is a key leafhopper regulator, the habitat manipulations herein described aid in building a whole beneficial insect complex which confers stability to the vineyard.

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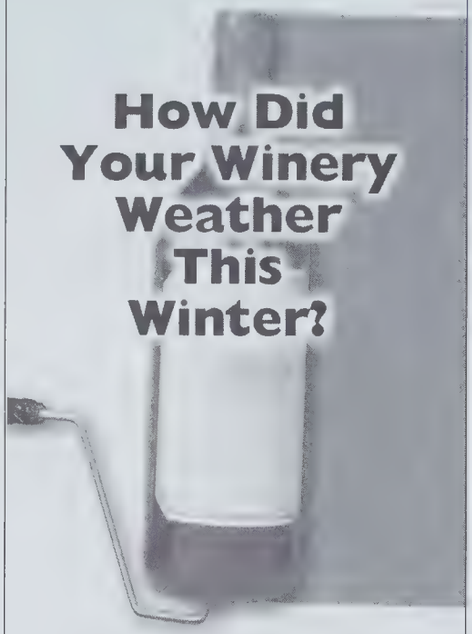

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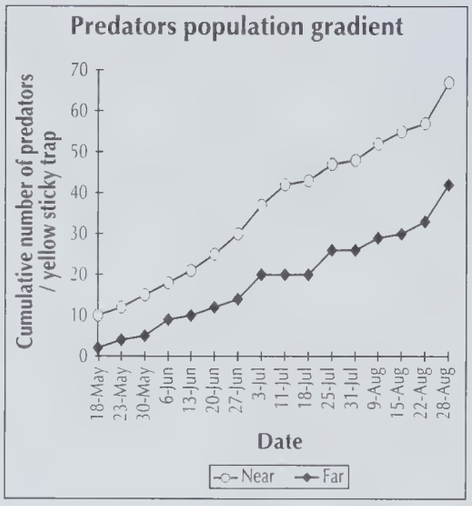


**Figure VI. Seasonal patterns of predator catches (numbers per yellow sticky trap) in vineyards as influenced by presence of the corridor (Hopland, CA 1996).**

### *Creating flowering islands as a push-pull system for natural enemies*

One good way to start integrating vineyard management and conservation of natural enemies is to develop a farm design, recognizing the reality that not all parts of a farm can be managed to maximize conservation objectives, such as habitat enhancement for beneficial arthropods.

Creating habitat on the least productive parts of the farm to concentrate natural enemies is a smart way to use and beautify marginal lands or less productive areas in the vineyard such as a ridgetop, a swale, etc. This is the biodynamic approach used at Benziger Family Estate (Glen Ellen, CA), where an island of flowering herbaceous annuals and perennials was created at the center of a vineyard and which acts as a push-pull system for natural enemy species.

The island has been planted with a mix of herbaceous plants, which provides flower resources from early April to late September to a number of herbivore insects (neutral non-pestiferous insects and pollinators), and associated natural enemies. The island acts as a source of pollen, nectar, and neutral insects which serve as alternate food to a variety of predators and parasites, including *Anagrus* wasps, a prevalent parasitoid in this vineyard (Figure VII).

During the 2004 season, sampling revealed that the island was dominated by

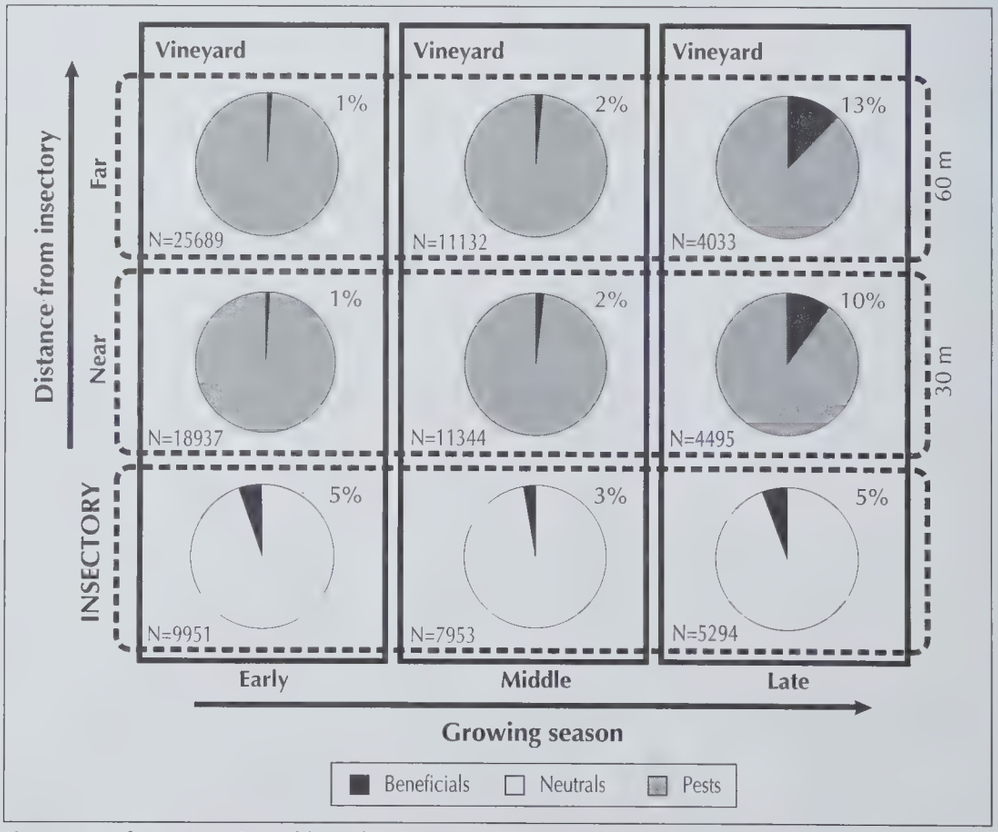


**Figure VII. The proportion of beneficials, neutral, and pestiferous insects (insects that feed on or exert damage to vines) in the island, and in the vineyard at various distances from the island as the season progressed (N = total number of insects caught in yellow sticky traps, % = proportion of beneficial insects).**

neutral insects that forage on the various plants, but also served as food to natural enemies which, starting in early June, slowly built up in numbers in the adjacent vineyard as the season progressed.

Catches in yellow sticky traps placed inside the island and at various distances within the vineyard, suggest that many natural enemies moved from the island into the vineyard (up to 60 meters). *Orius* sp. and Coccinellids are prevalent colonizers at the beginning of the season, but later syrphid flies and *Anagrus* wasps start dispersing from the island (insectory) into the vineyard (Figure VIII).

Parasitization of leafhopper eggs by *Anagrus* wasps was particularly high on vines near the island, with parasitization levels decreasing towards the center of the vineyard away from the island (Table I), a trend not observed at the Hopland corridor vineyard interface.

Planting flower strips (such as Alyssum) that go from the island into a vineyard, could be tried as an effective strategy to pull beneficials deeper into a vineyard and thus overcome the push-effect of the island which confines natural enemy activity to adjacent vine rows.

### Conclusions

A key strategy in sustainable viticulture is to enhance biodiversity at the

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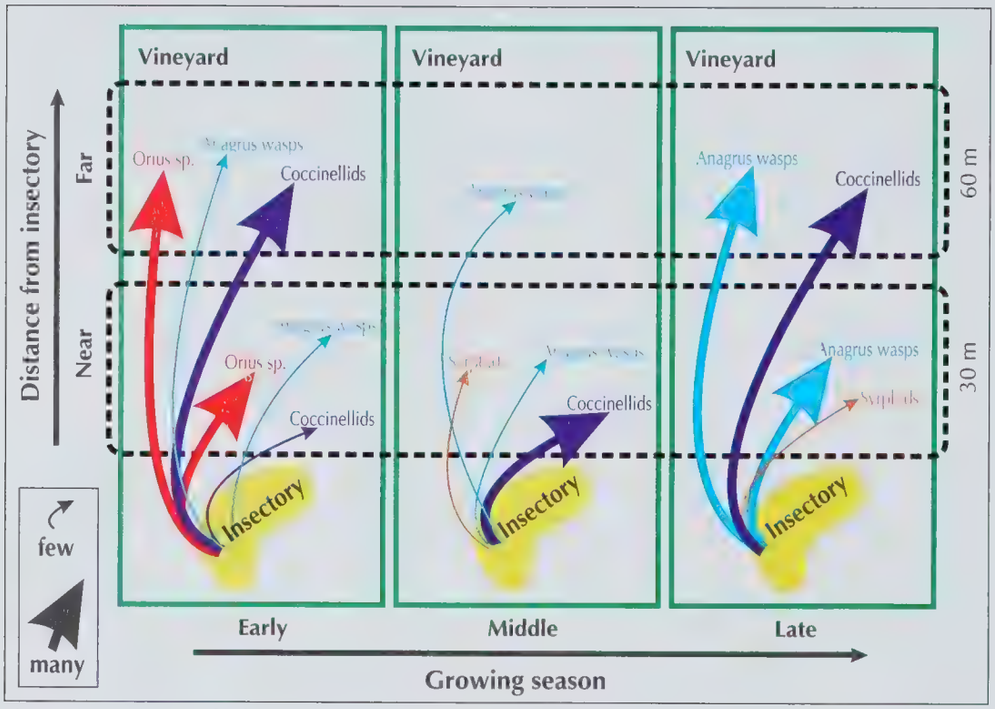


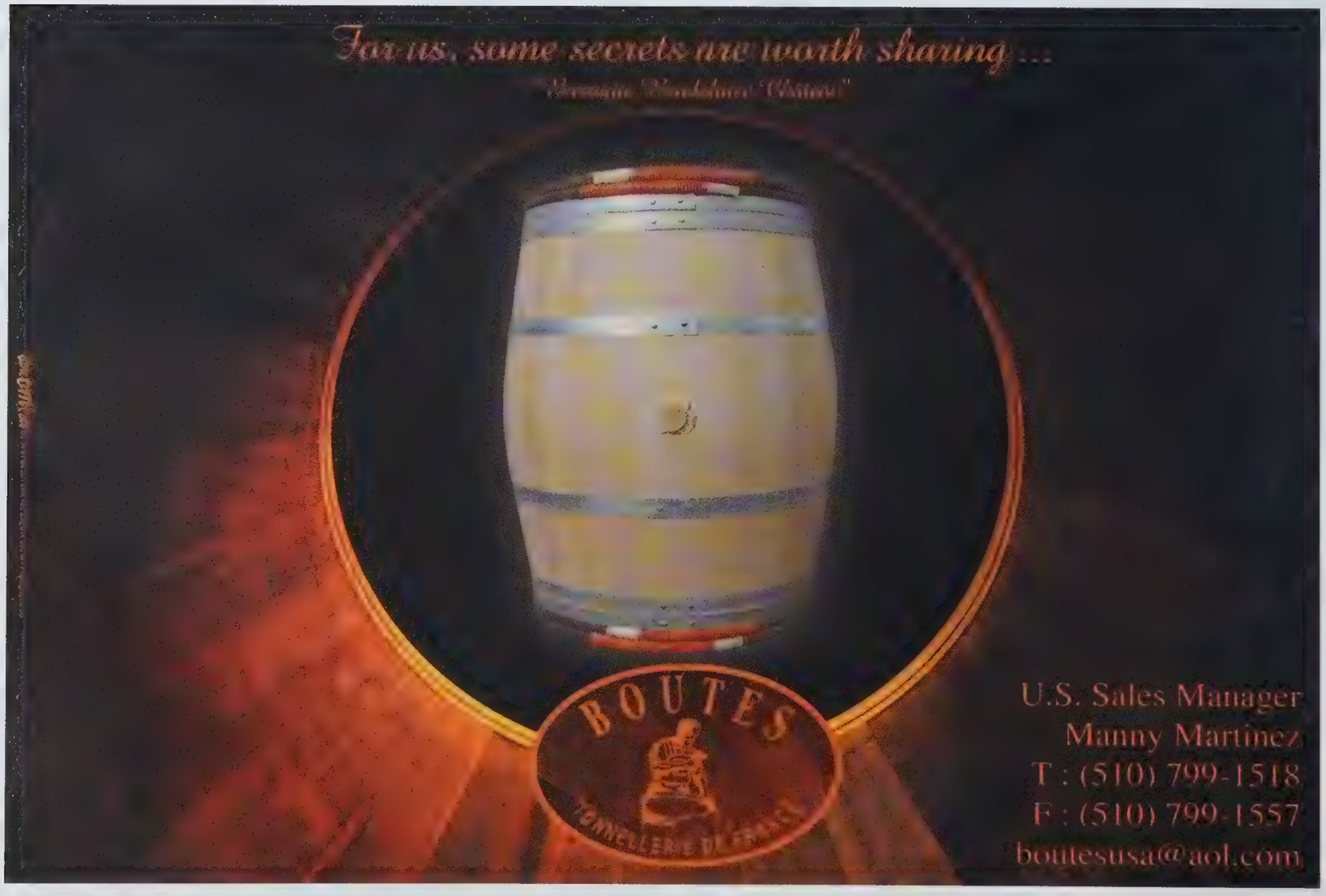

**Figure VIII. Dispersal of *Anagrus* wasps and generalist predators from the island into the vineyard.**

landscape and field level through the use of cover crops, corridors, and various habitats. Emergent ecological properties develop in such diversified vineyards, allowing them to function in a self-regulating manner.

The main approach in ecologically-based pest management is to increase agroecosystem diversity and complexity as a foundation for establishing beneficial interactions that aid in keeping pest populations in check.

Diverse and complex vineyards may be harder to manage, but when properly implemented, habitat management leads to establishment of the desired type of plant biodiversity and a unique ecological infrastructure necessary for attaining optimal natural enemy diversity and abundance.

Current knowledge of which plants are the most useful sources of pollen, nectar, habitat, and other critical needs is far from complete. Clearly, many



plants encourage natural enemies, but scientists have much more to learn about which plants are associated with which beneficials, and how and when to make desirable plants available to target organisms. Because beneficial's interactions are site-specific, geographic location and overall farm management are critical variables. ■

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**References**

1. Altieri, M.A., C.I. Nicholls. (2004). *Biodiversity and pest management in agroecosystems*. Food Products Press, Binghamton USA.

2. Daane, K.M., M.J. Costello, G.Y. Yokota, W.J. Bentley. (1998) "Can we manipulate leafhopper densities with man-

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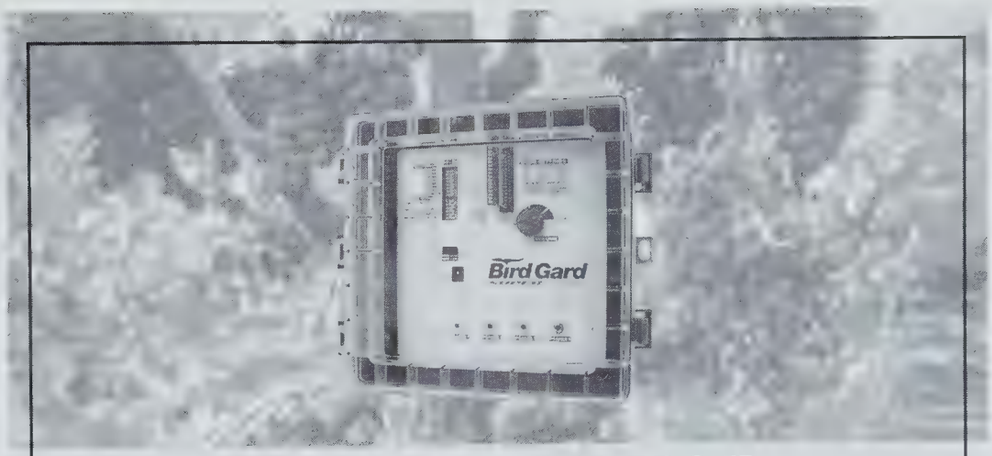


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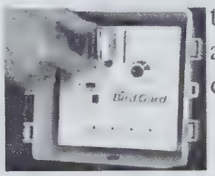

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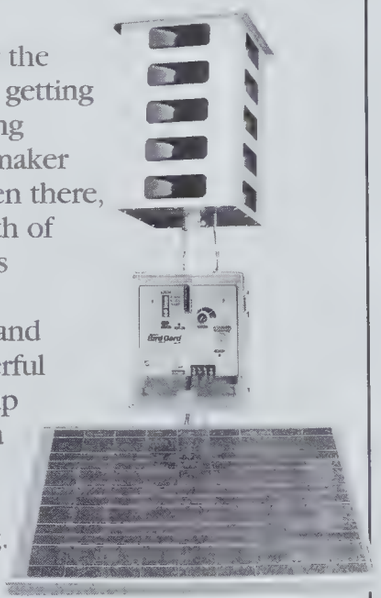

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agement practices?" *Grape Grower* 30 (4): 18–36.

3. Daane, K.M. and M.J. Costello. (1998) "Can cover crops reduce leafhopper abundance in vineyards?" *California Agriculture* 52 (5): 27–32.

4. Flaherty, D.L. (1969) "Ecosystem complexity and the Willamette mite, Eotetranychus willamettei (Acarine: Tetranychidae) densities." *Ecology* 50: 911–916.

5. Landis, D.A., S.D. Wratten, G.M. Gurr. (2000). "Habitat management to conserve natural enemies of arthropod pests in agriculture." *Annual Review of Entomology*, 45, 175–201.

6. Nicholls, C.I., M. Parrella, M.A. Altieri. (2001). "The effects of a vegetational corridor on the abundance and dispersal of insect biodiversity within a northern California organic vineyard." *Landscape Ecology*, 16, 133–146.

7. Nicholls, C.I., M.P. Parrella, M.A. Altieri. (2000). "Reducing the abundance of leafhoppers and thrips in a northern California organic vineyard through maintenance of full season floral diversity with summer cover crops." *Agricultural and Forest Entomology*, 2, 107–113.

8. Corbett, A. and J.A Rosenheim. (1996) "Impact of a natural enemy overwintering refuge and its interaction with the surrounding environment." *Ecological Entomology* 21: 155–164

## ACTION PLAN

To design an effective plan for successful habitat management, in accordance with the proven principles of ecologically-based pest management, first growers should gather as much information as they can. Growers should make a list of the most economically important pests and their associated natural enemies in the vineyard and find out:

1. What are the pest's food and habitat requirements?
2. What factors influence pest abundance?
3. When do pests build in the crop and when do they become economically damaging?
4. What are the most important predators, parasites, and pathogens?
5. What are the primary needs of those beneficial organisms?
6. Where do these beneficials overwinter, when do they appear in the field, where do they come from, what attracts them to the crop, how and when do they build up in the crop, and what keeps them in the field?
7. When do the beneficials' critical resources (nectar, pollen, and alternative hosts and prey) appear and how long are they available? Are alternate food sources accessible nearby and at right times? Which native annuals and perennials can compensate for critical gaps in timing, especially when prey are scarce?

Once growers have a thorough knowledge of the characteristics and needs of key pests and natural enemies, they are ready to design a habitat management strategy specific for their vineyard. A few guidelines need to be considered when implementing habitat management strategies:

1. Select the most appropriate plant species;
2. Determine the most beneficial spatial and temporal arrangement of such plants, within and/or around the fields;
3. Consider the spatial scale at which the habitat enhancement operates (such as field or landscape level);
4. Understand the predator-parasitoid behavioral mechanisms influenced by the habitat manipulation;
5. Anticipate potential conflicts that may emerge when adding new plants to the agro-ecosystem. (For example, while blackberries may increase populations of *Anagrus epos*, a parasitoid of the grape leafhopper, they may also host *Xylella fastidiosa*, the bacterium that causes Pierce's disease, as well as a disease vector, the blue-green sharpshooter.)
6. Develop ways in which the added plants do not upset other agronomic management practices, and select plants that have multiple effects, such as improving pest regulation while at the same time contributing to soil fertility and weed suppression.

## WINERY/WHOLESALER RELATIONSHIP

# Ten do's to increase sales

**BY Michelle Rowell,
NewLevel Group,
Napa, CA**

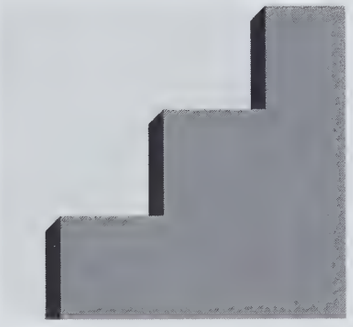
*At a recent conference attended by over 60 winery representatives in Napa, CA, a speaker asked audience members to raise their hands if they were satisfied with their wholesalers' results. Not a single hand was raised, serving as a potent reminder of the difficulties that so many wineries are currently facing as they work to sell their wines through the second tier.*

There are many reasons why wineries — large and small, neophyte and veteran — encounter tough times navigating the wholesale channel. Consolidation at the winery, distributor, and even retail tier is a major culprit, as is the ascendancy of the "pull-sale," which is driven by marketing, compared to the sales-driven "push" sale that has characterized the wine industry for so long. But regardless of the market dynamics at play, there is an even more fundamental reason for this problem: Many wineries forget the basics when it comes to managing their relationships with wholesalers.

Winery representatives are generally insanely busy — I've been one myself and I know how overwhelming those positions can be. Reps face a constant struggle with the feeling, "If it's Tuesday, this must be Seattle." Drawing on this experience, and on my days as a wholesaler rep, I've developed a list of do's and don'ts of distributor management.

This list is not revolutionary; rather, it is a reminder of things we know we should do as winery sales managers — but often do not. It's the knowing-doing gap. Despite their seemingly obvious nature, I've seen industry veterans do a lot of these don'ts and don't a lot of these do's.

Here are my top 10 do's to keep things copasetic both with upper management and with your sales representatives in the streets. (A corresponding list of top 10 don'ts will appear in the July/August–2005 ***PWV***.)



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### 1 *DO* STRIVE TO UNDERSTAND YOUR WHOLESALERS.

A recently completed research study by Sonoma State University professors Liz Thach, Ph.D and Janeen Olsen, Ph.D yielded tremendous insight into how wholesalers think. The findings included information on what is most important to wholesalers and what they need from wineries in order to be successful.

By taking the time to seek out and comprehend this information, we can take the first step in better understanding the wholesale business. Just as with interpersonal relationships, a clearer and deeper understanding of what's most important to your partner is the first step toward building a strong foundation for a good business relationship.

### 2 *DO* PRESENT YOUR BRAND'S SALES AND MARKETING PLAN TO YOUR WHOLESALER, ALONG WITH DIRECTIONS ON HOW TO IMPLEMENT IT.

First, you need to *have* a sales and marketing plan. If you don't, you need to develop one. Any winery operating without a well-considered sales and marketing plan is operating at a clear disadvantage.

Beyond providing strategic direction for your winery, the sales and marketing plan should also help you make some key decisions that will affect your success, such as varietal mix per market and pricing in the near- and medium-term. Although recent market conditions have certainly caused many of us to focus on what we can do right here and right now to sell XX-number of cases, it's also important to understand your winery's long-term direction, and to share this with your wholesalers.

Borrowing an analogy from Fred Reno of the Henry Wine Group: When it comes to your winery's battle to succeed, *you* are the general. It's up to *you* to define your goals, develop your strategy, and carefully plan your attack. When you have done that, utilize your wholesalers as the foot soldiers in your army to carry out your plan.

### 3 *DO* PRICE YOUR WINE RIGHT THE FIRST TIME.

Wineries have a significant amount of time between producing their wines and releasing them to the market. Yet, too often, prices are communicated to wholesalers at the last minute, when the wine is ready for shipment. Wholesalers need ample time and notification to bring your prices to the trade, especially for new vintages that have had price increases. I am sure NO one reading this has *ever* missed a price posting deadline in a posting state, right?

Distributors don't like having to lower a price on a wine just to raise it again a month or two later any more than we do as wineries. On the nuts-and-bolts side, price fluctuation means administrative busy work, but the bigger problem is that it upsets customers, causes lost placements and bad blood between wholesaler reps and their accounts.

The best way to avoid discounting and its assorted troubles is to price your wine correctly upon its release. Barring unforeseen circumstances, you should feel comfortable when you set the price that you'll definitely be able to sell the desired amount of wine over the course of the year. Don't price it with the hope that you'll be able to sell it if a miracle happens and it's 1999 again.

There's no magic formula for pricing. It's a combination of art and science that takes many factors into account, including brand strength, quality, production volume, costs, and overall positioning. It takes a lot of work up front, but pricing your wine right the first time is clearly beneficial for everyone involved — you, your wholesalers, and especially your brand.

### 4 *DO* KEEP LINES OF COMMUNICATION OPEN AND EASY.

It's critical to respond quickly to your wholesalers, and if you have a

multi-person sales team, empower your people in the field who manage wholesalers to do so as well.

Working with wholesalers requires quick responses to questions regarding special pricing, inventory, release dates, event donations, promotional material, etc. In most instances, wholesalers are forwarding a question to wineries from their accounts. When winery personnel fail to respond quickly to wholesalers, it makes wholesalers look unresponsive to their customers, which is detrimental to those relationships.

A slow response from the winery could mean a lost sale not just to the wholesaler, but also to a rep whose income is based on commission. On the other hand, a quick decision could mean strong depletions for you, a happy account to the wholesaler, and a fat paycheck for the sales rep. Fat paychecks make sales reps like you!

When I was a sales rep, I called on the Fish Market, which is a high-volume account that had four outlets at the time in the San Francisco Bay Area (they now have nine). As a "seafooder," it cruised through Chardonnay by the glass.

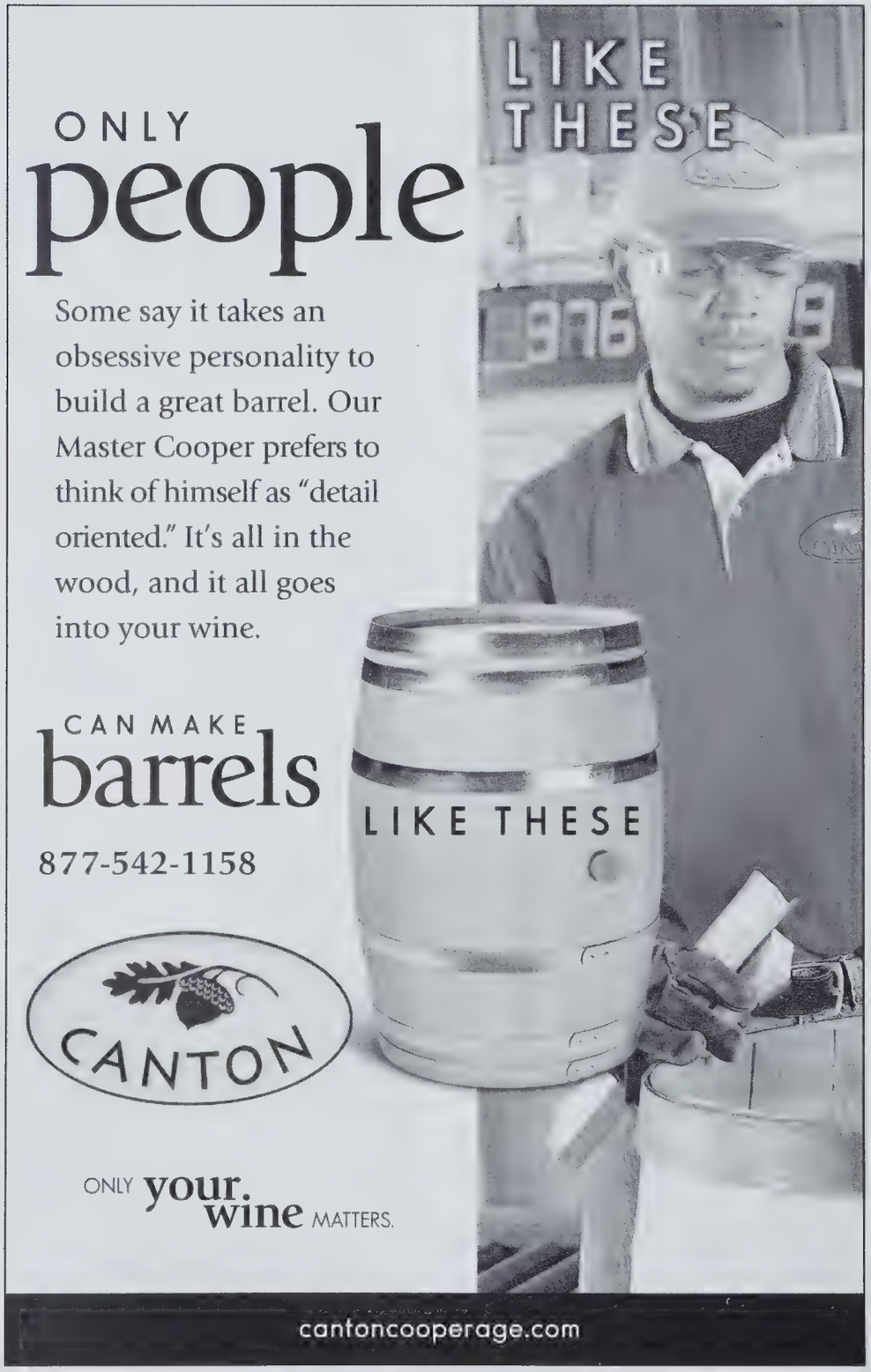
I called the Fish Market buyer on a Thursday afternoon and learned that the buyer had just been informed that the regular Chardonnay he was pouring by the glass was going up in price, effective immediately. The rep who had this placement was not given the option to replace it with something else from his book because the buyer was upset that no one had told him of the price increase beforehand. Of course, the rep claimed he had just found out.

Luckily for me, I was the next rep who walked through the door. The buyer needed 40 cases of Chardonnay the next day, and he needed to taste it before purchase. I immediately called the winery in my portfolio that had the perfect wine for this placement, and left a voice mail.

Seemingly miraculously, that winery rep returned my call right away! I was able to pick up a sample within the hour, then went back to the restaurant, tasted the buyer on it, and placed an order. By this time I had missed the order deadline, so I had to will-call the 40 cases of Chardonnay the next day and deliver 10 to each restaurant. I'm still in shock that all 40 cases fit in the little hatchback I was driving at the time! (My shocks were shocked, too.)

The moral of this story is that quick and responsive communication leads to depletions and happy wholesalers — who are more likely to work hard for your brand in the future. (The other moral of the story: Don't lift up cases of wine while bending over inside hatchbacks. Your back will never forgive you.)

In addition to responsive communication, wineries also need to communicate proactively to their wholesalers. When I asked a friend who works for a wholesaler about winery *do's* or *don'ts*, she replied: "Do communicate. Communication — everybody thinks they are good at it, but only a few truly are. Wineries often feel they are conveying what they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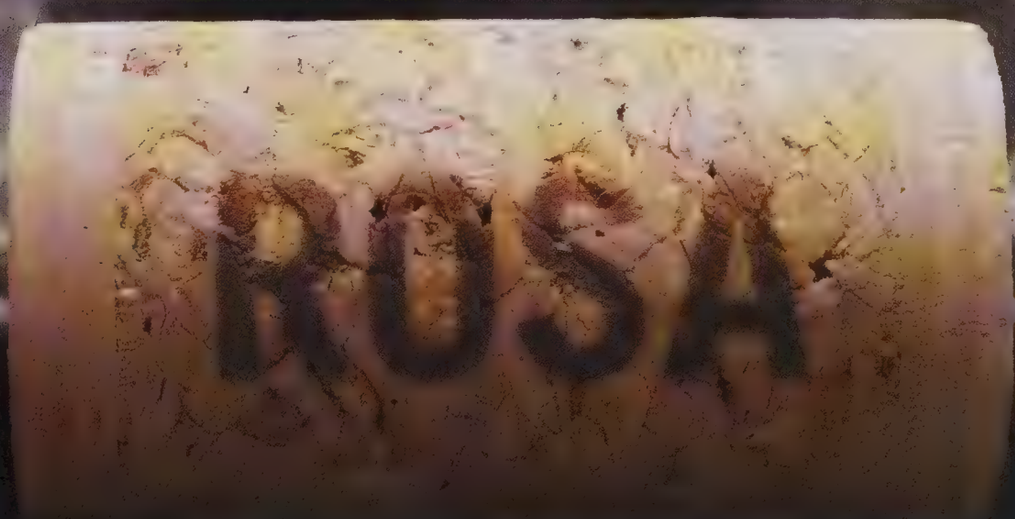


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want, but being on the receiving end of that communication, I find the message is often muddled.

"Many wineries feel they aren't getting enough attention or the pricing they want, etc., but sometimes I swear they don't say anything about it until they're about to notify the distributor that they're letting them go. It's important for all involved to remember that this is a relationship like any other; would you really want to date someone who gave you only infrequent and vague ideas to go on, then got mad and left when you didn't do what they wanted?"

One last point on communication: We need to make sure we're speaking the same language as our wholesalers. One perhaps helpful place to begin: Along with my colleagues Jack Stuart and Kathleen Meek, I put together a glossary of frequently used industry terms that is available at www.newlevelgroup.com.

**5 *DO* CONSIDER MENTORING DISTRIBUTOR SALESPEOPLE.**

This is a fairly easy way to create your own brand ambassadors in the marketplace. When you personally click with a rep during a meeting or a work-with (travel all day in the marketplace with one), be sure to nurture that relationship. If the situation is right, consider offering the kind of guidance that can grow into a mentoring relationship.

Distributor reps frequently want to learn more about the industry beyond their markets. Wineries have the experience and the knowledge to share with them. Often a rep's longer term career goal is to work as a winery supplier. I'm not suggesting that you recruit reps (that's under the heading, "How to make your wholesalers hate you"), but by offering yourself as a resource and showing an interest in their career development, you're building a relationship that could last for many years.

An example: Years ago, an accomplished sales professional I know was working for a large east coast distributor as a rep. He was mentored by a winery rep who believed in him and saw his potential. The rep is now the VP of sales for that distributor, and that brand is still in the same portfolio. You can bet that he makes sure that brand gets taken care of. Which brings me to point #6: We all know this is a pretty small industry, so …

**6 *DO* BE VERY NICE TO ALL OF THE PEOPLE WHO WORK FOR YOUR DISTRIBUTOR — AT EVERY LEVEL.**

Let's start with sales people – even the ones in the ancillary markets. You need to treat them like gold. Today's rep is tomorrow's district manager. No matter how bad your flight was, how unhelpful the hotel was with your reservation, or how bad the burnt toast at breakfast, *Never take it out on the rep you're scheduled to meet that day!* Put quite simply, being a jerk is the easiest way to make sure that rep never sells another bottle of your wine.

When I was a supplier, I knew another winery rep who worked for a large winery. This guy was new to the wine industry, very gruff, and treated sales reps as if they were worthless. It was well known among this distributor's sales force that they should try to

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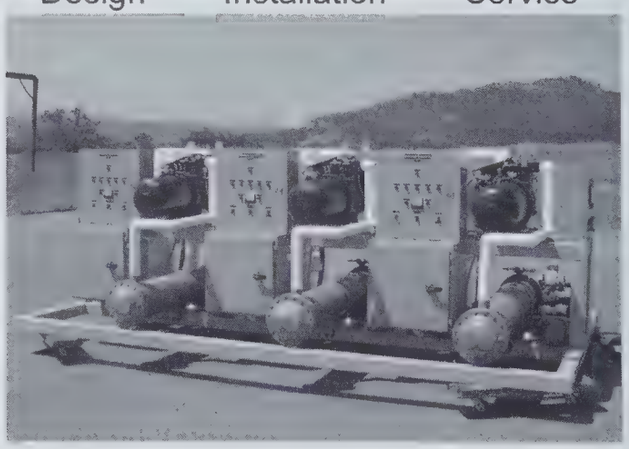
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sell any other brand in their portfolio instead of his. While in this distributor's offices, I actually heard a rep ask another, "My account wants a case of this guy's wine brand. But that guy is such an (*insert expletive here*). What should I sell my account instead?"

Beyond sales reps, try to forge relationships with everyone at the distributor who has anything to do with your brand, anywhere along the sales cycle. Do you know who is responsible for samples? He or she can be a great ally.

Of course, being extra nice to management gatekeepers goes without saying. Regardless of how low on the totem pole the person at the distributor is, and regardless of how high you think you are, treat everyone well. Both bad and good behavior will eventually get back to decision-makers, so check your nastiness at the door.

**7 *DO* KNOW HOW TO BE A SALESPERSON YOURSELF.**

Very few people selling wine for wineries had careers in sales *before* coming into the wine industry. Many of us came into this business because of a love for wine, not necessarily a love of closing the deal. Unfortunately, too often we get lost in the wonderful wine part and get a bit uneasy at the less poetic sales part.

Although many of us would prefer to take a course on biodynamics or clonal selection in our spare time, consider sales training instead. No matter how much you know about wine, even if you're an Master Sommelier or a Master of Wine, it still doesn't mean you'll be able to work the market and work with wholesalers in an agreeable and effective manner.

**8 *DO* TAKE TIME TO REVIEW, UNDERSTAND, AND ACT UPON YOUR MONTHLY REPORTS.**

Depletion reports and other data are important tools when it comes to distributor management. Yes, it's tough to obtain them sometimes, but more suppliers are now making this data available online. You don't have to be a database wizard to learn how to decipher this information. It's the only tool you have to gauge how your distributor is doing beyond sales out of your warehouse. You can track lost placements and sluggish reorders, sometimes determine the best reps and regions, and maybe more important, determine the worst. And, you can raise the red flag and work to do something about it before it's too late.

**9 *DO* MAKE SURE THAT YOU HAVE A CLEAR, COMPELLING AND CONCISE BRAND MESSAGE TO IMPRESS UPON YOUR WHOLESALERS.**

Basically, this is your brand's elevator pitch — the one sentence that communicates the most important information about your wine brand. You must have one, you must communicate it, and everyone at your wholesaler's should be able to repeat it. Every winery rep should know by heart that *one unique sentence* that answers the questions, "What are you all about and why should I care?"

**10 *DO* PULL AS WELL AS PUSH.**

Marketing has never been more important than it is today. Do you know if your problems selling wine have to do with lack of push, as in from your wholesalers, or lack of pull from consumers once your wine is placed? It's critical to know the answer to this so that you can focus your efforts on the right solution. If your brand is not interesting and appealing to consumers, if it's not selling once it's in restaurants and on retail shelves, then regardless of how well you manage your wholesalers, your brand will not become the success that you envisioned it would be.

That's it for the 10 Do's that will help improve your wholesaler relationships and, by extension, increase your wholesale sales. Sometimes, however, what you don't do is just as important. We'll cover 10 things on the Don't side to increase sales in the next issue of *PWV*.■

*As a wine sales / marketing consultant with NewLevel Group in Napa, CA, Michelle Rowell uses her decade of experience in all tiers of the three-tier system to help wineries improve relationships with wholesalers to sell more wine. Michelle may be reached at 707/255-5555 x 104 or mrowell@newlevelgroup.com.*

**Figure I. Effect of root growth on the above-ground growth of vines. A) Inefficient soil preparation induced a small root volume and it corresponds to decreased above-ground growth. B) Efficient soil preparation induced a large root volume with increased above-ground growth.**

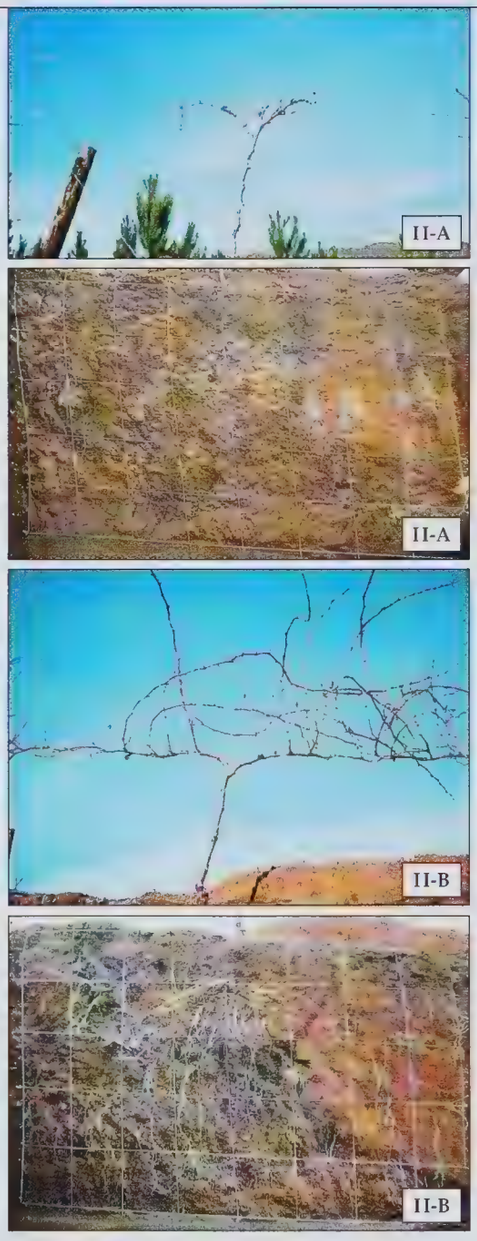



**Figure II. Effect of root growth on the above-ground growth of vines. A) Small root volume caused by ineffective planting hole. B) A proper planting hole ensures a big root volume with increased above-ground growth.**

# VINE BALANCE *drives* GRAPE QUALITY

**BY Eben Archer,**
**Lusan Premium Wines,**
**J. J. Hunter,**
**ARC Infruitec-Nietvoorbij,**
**Stellenbosch, South Africa**

Vines are climbers and genetically inclined to favor shoot growth. As long as conditions favor the vine (sufficient water and nutrients and high temperature), it will be inclined to grow vegetatively — often at the expense of reproductive growth. Therein lies the challenge for viticulturists: to manage a vine to achieve controlled growth.

The only natural way for a vine to propagate is through its seed. If a vine receives physiological messages that times are going to be tough, thus threatening its survival, its natural reaction is to shift its focus away from vegetative growth. It signals its metabolism to favor seed development in an attempt to foster high quality seed for propagation.

In the process, development of the mesocarp (the pulp around the seed) benefits also, and high quality berry development occurs at the same time and good grape composition is achieved. The challenge for viticulturists, therefore, lies in managing vines to promote seed development, without pushing the vine into a real stress situation where normal physiological processes are compromised. In human terms, management actions must be established to "cheat" a vine into "believing" that it will perish, without the danger of this actually happening.

This level of vineyard management is relatively simple to achieve in instances where controlled growth occurs compared to instances where vegetative growth is overly vigorous. In controlled growth situations, the vine is balanced between subterranean and aboveground growth; between fine and thick (superficial and deep) roots; between left and right cordons; between shoot growth and yield; and between young and old leaves in the canopy.

### *Balance between above ground and subterranean growth*

The vine strives towards a 2.5:1 ratio between above ground and subterranean growth.[2] An improvement in root growth produces 2.5 times the improvement in growth above the surface. There is always a balance between the number of root points (as an indication of root distribution) and the amount of growth above the surface (Table I).

Vines with more roots per allocated space have a bigger shoot-growth capacity than those with fewer roots. This relationship is clearly illustrated by Figures I, and II. Colonization of the soil volume available to a vine is therefore of primary importance.

Since, in most instances, the above ground to subterranean growth bal-

**Figure III-A, B. A balanced above-ground growth must be sustained by correct pruning practices to maintain balanced shoot growth.**

ance is dictated by the size of the root system, the effectiveness of soil preparation is decisive in the establishment of vine balance. A root volume that enables colonization of both a fine root and a deeper tap root system is a prerequisite for a sustainable balance between growth above and below the surface.

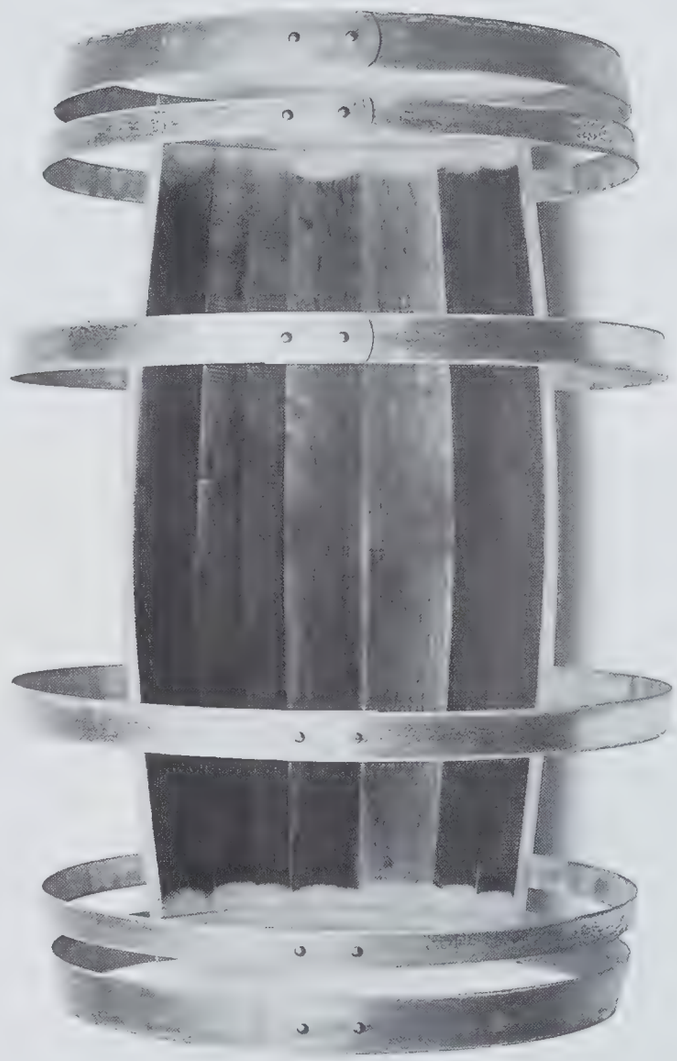
In South Africa, for example, the soils are naturally very compact and acidic. With low rainfall and limited water resources, we have to create well-buffered root systems to be viable with regard to both quality and yield. This will be the same in other countries with similar circumstances, and it becomes even more important in the face of threatening global warming — we have to make sure of enough soil water reserves.

It should be borne in mind, however, that with an ineffective trellis system inadequately sized to the canopy, which results in canopy crowding and consequently in interior canopy shade, this balance and the balance between fine and tap roots may be disturbed unilaterally, thus causing an imbalance in the vine.

Root growth studies in the 1980s (by author J.J. Hunter and others) clearly showed a marked increase in the number of fine roots and an increase in depth

**TABLE I: Effect of number of roots on shoot mass as affected by various rootstocks, Nietvoorbij, 1974–1981.[6]**

| Rootstock | Number of roots per $m^2$ profile wall | Average shoot mass (t/ha) |
|---|---|---|
| Ramsey | 595 | 4.22 |
| 99 Richter | 402 | 3.06 |
| 101-14 Mgt | 343 | 2.95 |
| 143-B Mgt | 340 | 2.41 |
| Jacquez | 293 | 1.96 |
| 3306 Couderc | 266 | 1.84 |
| Teleki 5BB | 136 | 1.24 |



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penetration of tap roots with an increase in trellis size and corresponding canopy quality. In a comparison of too small to large enough trellising, the fine root number increased from 1,188 to 3,932 per vine while the number of thick roots stayed virtually the same.[6]

Root growth points are important production organs for certain growth hormones. The hormone balance that exists within the vine dictates the growth and ripening processes, and if this balance is disturbed (such as by a poorly developed and functioning root system), the internal plant processes that are necessary for a balanced vine, are also disturbed.

Poor pruning and/or poor canopy management practices, on the other hand, are also responsible for a disturbance of the balance, thus contributing to unbalanced vineyards. If a balance is created between the rootstock and scion, it must be maintained by the correct cultivation practices (Figure III).

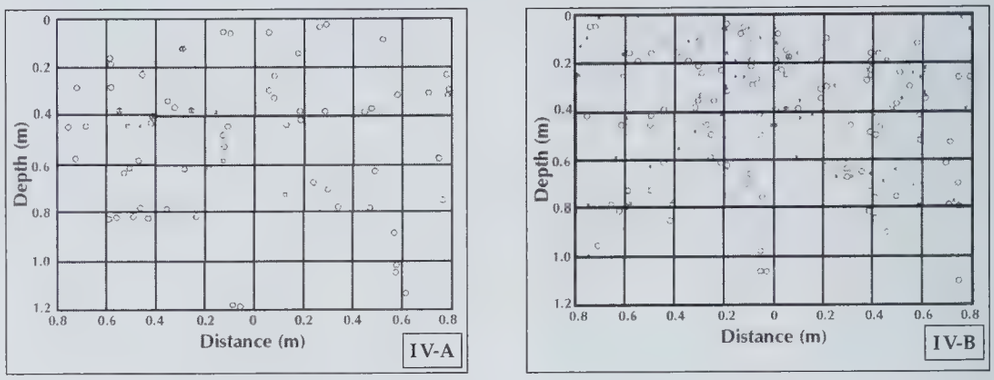


**Figure IV. Influence of correct canopy management on root diameter balance of vines: A) no leaf removal; B) 33% leaf removal.**
**Ý = < 0.5 mm; o = 0.5 – 2mm; x = 2 – 5 mm; o = 5 – 10 mm; V = > 10 mm.**

### *Balance between fine and thick roots*

Balanced growth above the surface brings about balanced distribution of nutrients resulting in the optimal functioning of all vine parts. This is mainly due to a much more even distribution of the xylem stream between left and right cordon arms, because the cordons are balanced by the same number of buds (growing points).

The correct trellis system, plant spacing, pruning practices, and canopy management, plus judicious fertilization and irrigation, will also affect the composition and distribution of the root system.

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**TABLE II: Grape composition of Cabernet Sauvignon/R99 as affected by different shoot lengths.[1]**

| Shoot length (cm) | Sugar concentration (°B) | Acid concentration (g/l) | pH | Skin color (520 nm) |
|---|---|---|---|---|
| ± 60 | 23.4 | 5.2 | 3.8 | 1.203 |
| ± 120 | 24.5 | 7.4 | 3.3 | 2.761 |
| > 200 | 21.9 | 8.9 | 3.2 | 1.078 |

**TABLE III: Grape composition of Merlot/R99 as affected by different shoot lengths.[1]**

| Shoot length (cm) | Sugar concentration (°B) | Acid concentration (g/l) | pH | Skin color (520 nm) |
|---|---|---|---|---|
| ± 60 | 23.6 | 4.2 | 4.1 | 1.341 |
| ± 120 | 24.9 | 7.1 | 3.4 | 2.043 |
| > 200 | 21.3 | 10.3 | 3.9 | 0.981 |

**TABLE IV: Grape composition of Sauvignon Blanc/R99 as affected by different shoot lengths.[1]**

| Shoot length (cm) | Sugar concentration (°B) | Acid concentration (g/l) | pH | Skin color (520 nm) |
|---|---|---|---|---|
| ± 60 | 20.5 | 4.0 | 3.8 | None |
| ± 120 | 24.3 | 8.6 | 3.3 | Outspoken |
| > 200 | 19.1 | 14.0 | 3.7 | Traces only |

In Figure IV, the effect of correct canopy management (resulting in optimal canopy microclimate and functioning) on the root diameter balance is shown. Canopy management stimulates the development of roots especially in the smaller diameter classes.[4,5] In the previously referenced root growth research, it was proven that shoot thinning to 14 shoots/m cordon, upright shoot positioning, tipping to 1.2 to 1.4m shoot length, and leaf thinning to achieve sunlight energy of more than 150 micro Einsteins /$m^2$/s in the cluster zone markedly increased the number of fine roots per vine.

A higher incidence of such roots increases the uptake ability of the root system and results in more efficient utilization of minerals and water. A further very important consequence is the production of growth hormones that regulate aboveground growth, cluster development, and grape composition.

### *Balance between right and left cordons*

Although the balance between right and left cordons is applicable to a split-cordon vine shape, the principles involved are also of vital importance to single cordon and bush vines. Vines with an unbalanced permanent structure, such as a short cordon on the one side and a long cordon on the other side, or an unbalanced circle of bearer arms in the case of bush vines, result in heterogeneous shoot lengths with corresponding heterogeneous levels of ripeness in the grapes.

Tables II, III, and IV indicate that heterogeneous shoot lengths deriving from uneven cordons in the case of Sauvignon Blanc, Merlot, and Cabernet

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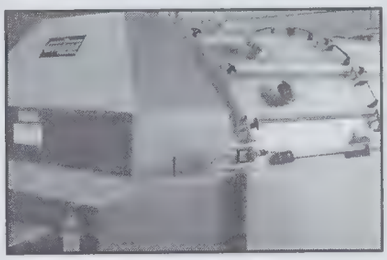

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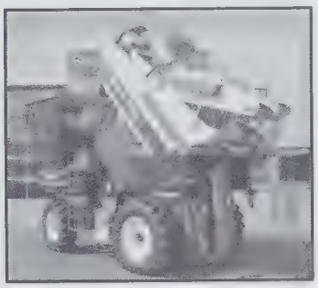

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**Figure V. Heterogeneous shoots are responsible for heterogeneous bunch development.**

Sauvignon result in uneven ripening. The occurrence of green and overripe grapes in the same vine plays a role in the dilution of the potential quality and leads to yields with unpredictable and poor wine quality. Heterogeneous shoot lengths also result in heterogeneous cluster size (Figure V).

The only way to obtain balanced cordons is by ensuring that upright trunks are formed during the vine development procedures. In this regard, a uniform cordon split, with cordons that fully cover the cordon wire, is a prerequisite (Figure VI).

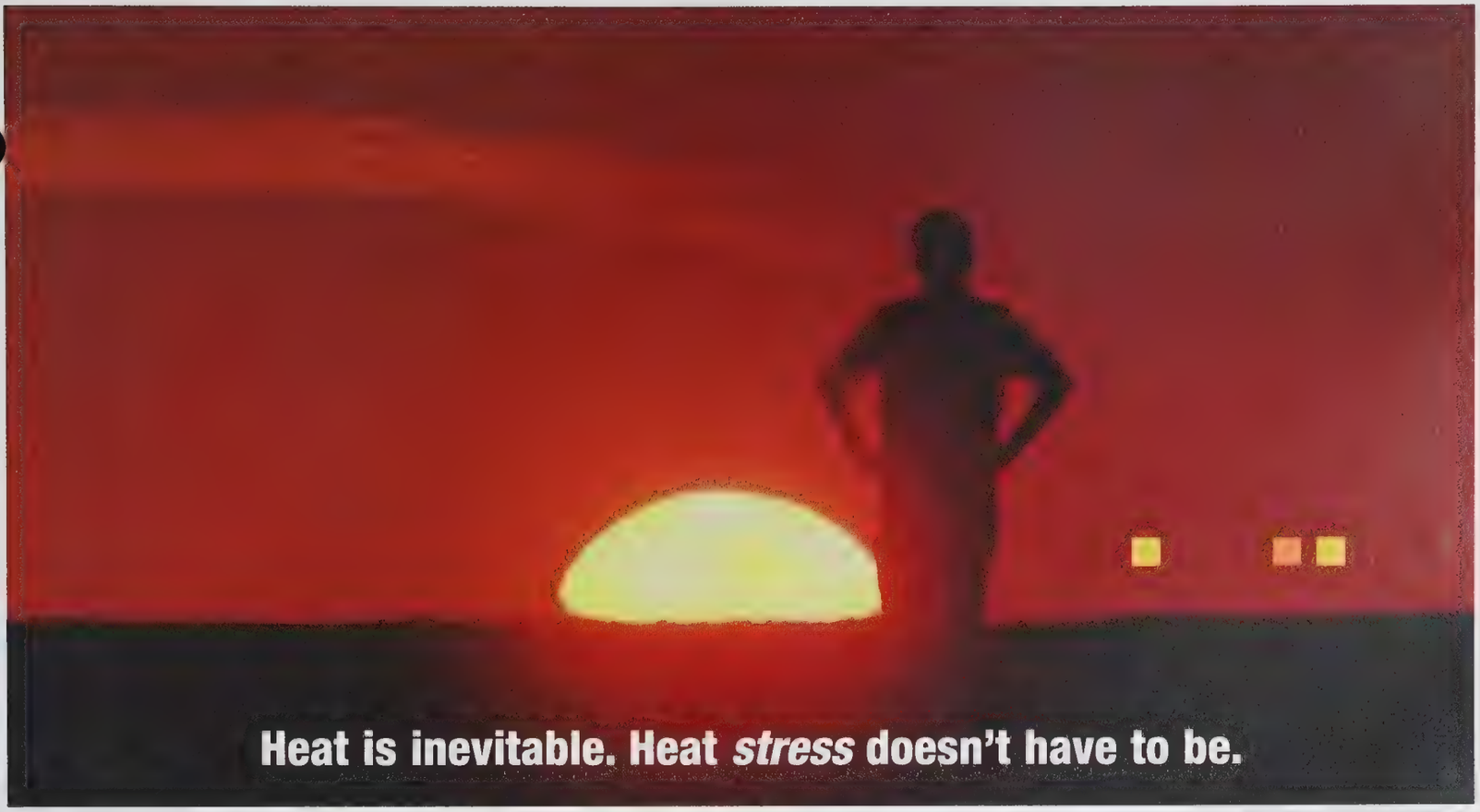
A balanced cordon is obtained by allowing the same number of buds on the left and right cordon shoots. The balancing is based not only on length or thickness. If the balance has been created in adult vines, it is vitally important that it be maintained by means of effective pruning practices. This is achieved by allocating the same number of buds left and right every year, so the same number of sinks on both sides may exercise a balanced demand for the division of the water and nutrient pool.

### *Balance between shoot growth and yield*

When primary shoot growth is naturally arrested (shoot tips are aborted), within three weeks after the beginning of veraison, it is a sign that there is a good balance between shoot growth and crop. Such a balance ensures good ripening with balanced grape composition and eventual good wine quality, especially once the shoots have reached a length of 1.2 m to 1.6 m. This shoot length is indicative of sufficient leaves per shoot to ripen two clusters

**Figure VI. Badly formed cordon arms (A, B, C) induce vine imbalance. D) Cordon shoots can be crossed over to create a better vine balance. E) Correct training procedures create balanced cordon splits.**

**Figure VII. Upright shoots ensure effective use of the trellis system.**

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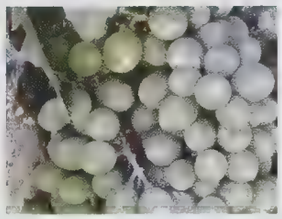

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completely, but the prerequisite is that the leaves must be efficiently exposed to sunlight. Long before this, there has been a marked decrease in shoot elongation, which means that the translocation of carbohydrates has already turned around in favor of the clusters.

Cardinal prerequisites for this balance are the following:

I. Spur spacing that provides each fertile shoot with enough space in the canopy, so it may assume its rightful place — in an upright position — in the trellis without too much overlapping (Figure VII);

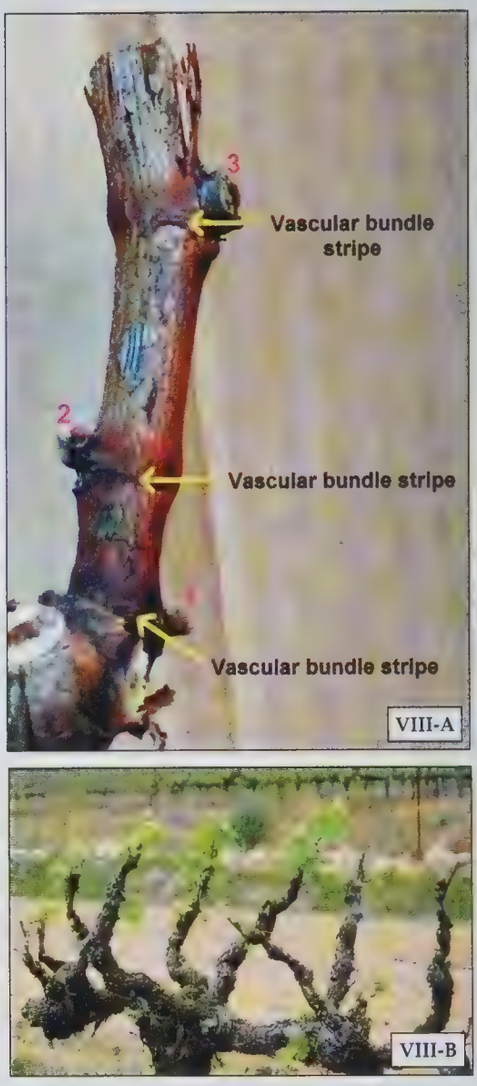
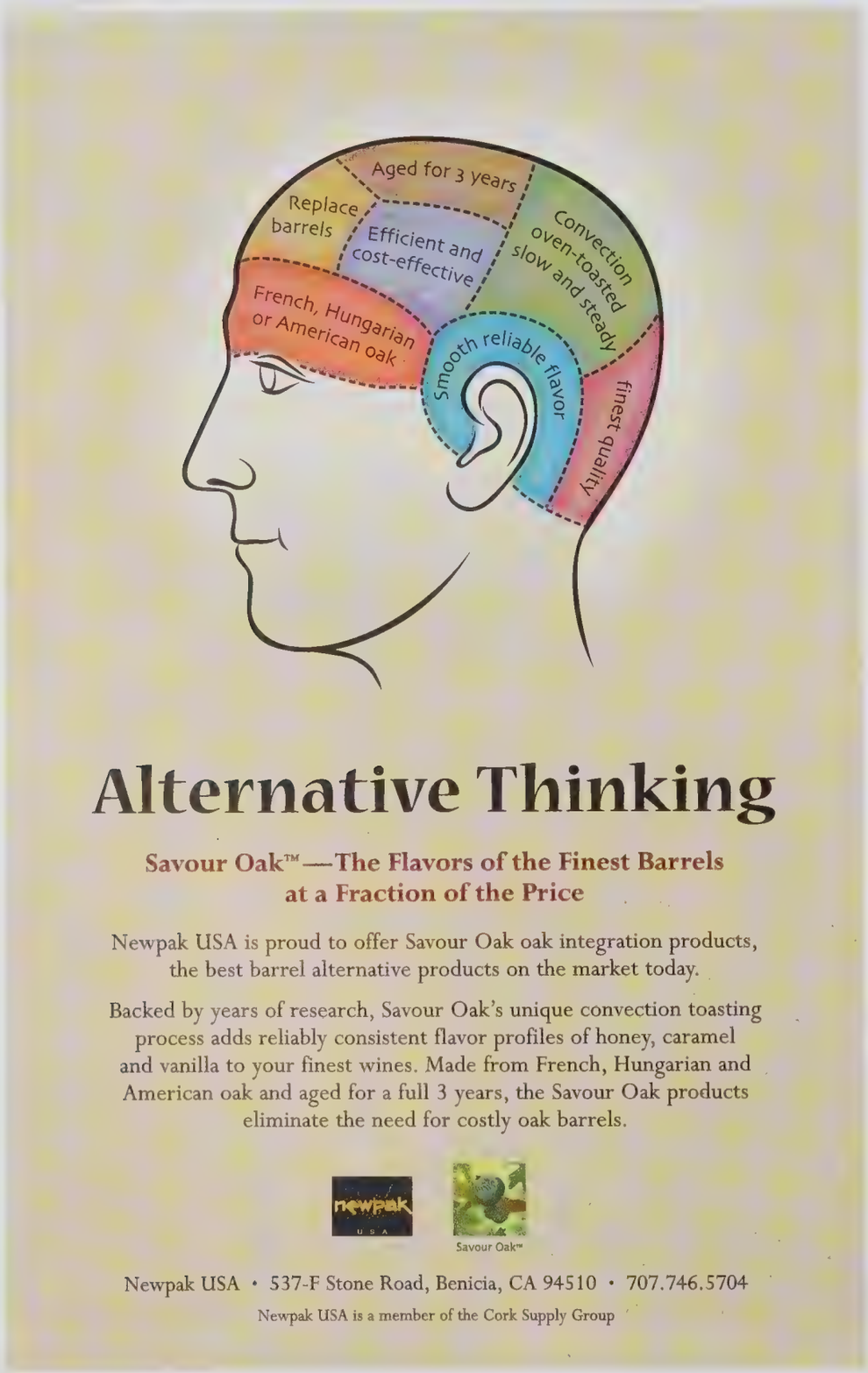



**Figure VIII. The correct choice of spur length prevents the build-up of permanent wood over the long-term.**
**A. Wrong spur length**
**B. Long-term effect of the build-up of spurs.**

II. An effective spur length that prevents the build up of spurs, so each fertile shoot may reach its rightful length for a correct leaf surface to fruit mass ratio. This ensures complete ripening (Figure VIII);

III. A trellis system that can accommodate shoot growth and does not limit it. This prevents excessive and untimely topping and provides sufficient space for shoots to stop growing spontaneously after veraison. On such a trellis system, it is also easier to achieve even shoot length (Figure IX).

Vines with shoots that stop growing before veraison are just as unbalanced as vines with shoots that continue to grow after ripening. The occurrence of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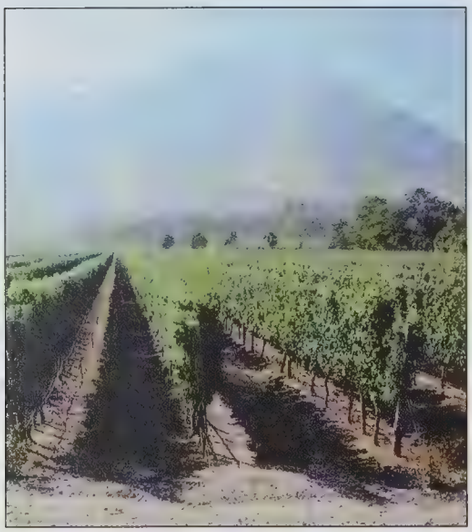


**Figure IX. Even shoot length obtained by means of an effective trellis system.**

both kinds of shoots results in grapes with heterogeneous composition and plays a role in inferior wine quality.

Shoots that stop growing before veraison have insufficient young leaves (prefer to have between 16 and 25 leaves total depending on the cultivar) to ripen their clusters, and shoots that grow actively during ripening have growth points that compete too much with ripening clusters for photosynthetic products. In both instances, optimal grape composition is compromised.

Figure X shows a trellis system that will accommodate effective shoot growth under most conditions. Spacing of the movable canopy wires is most important.

**Figure XI. Trellis system and shoot positioning will influence occurrence of slanting shoots. A) Slack canopy wires cause slanting shoots. B) Ineffective trellis causes slanting and overhanging shoots. C) Leaves and lateral shoots on slanting shoots all grow to one side.**

For cultivars with shoots that grow upright (such as Sauvignon Blanc, Cabernet Sauvignon, Cabernet Franc, and Pinotage), it is recommended that the first set of movable canopy wires be attached no higher than 20 cm (about 8 inches) above the cordon wire. Additional movable canopy wires must be spaced not more than 30 cm (about 12 inches) apart, and the entire pole must be used right to the top.

For cultivars with floppy shoots (such as Merlot, Shiraz), it is recommended that the first set of movable canopy wires be attached no higher than 15 cm (about 6 inches) above the cordon wire. Additional movable

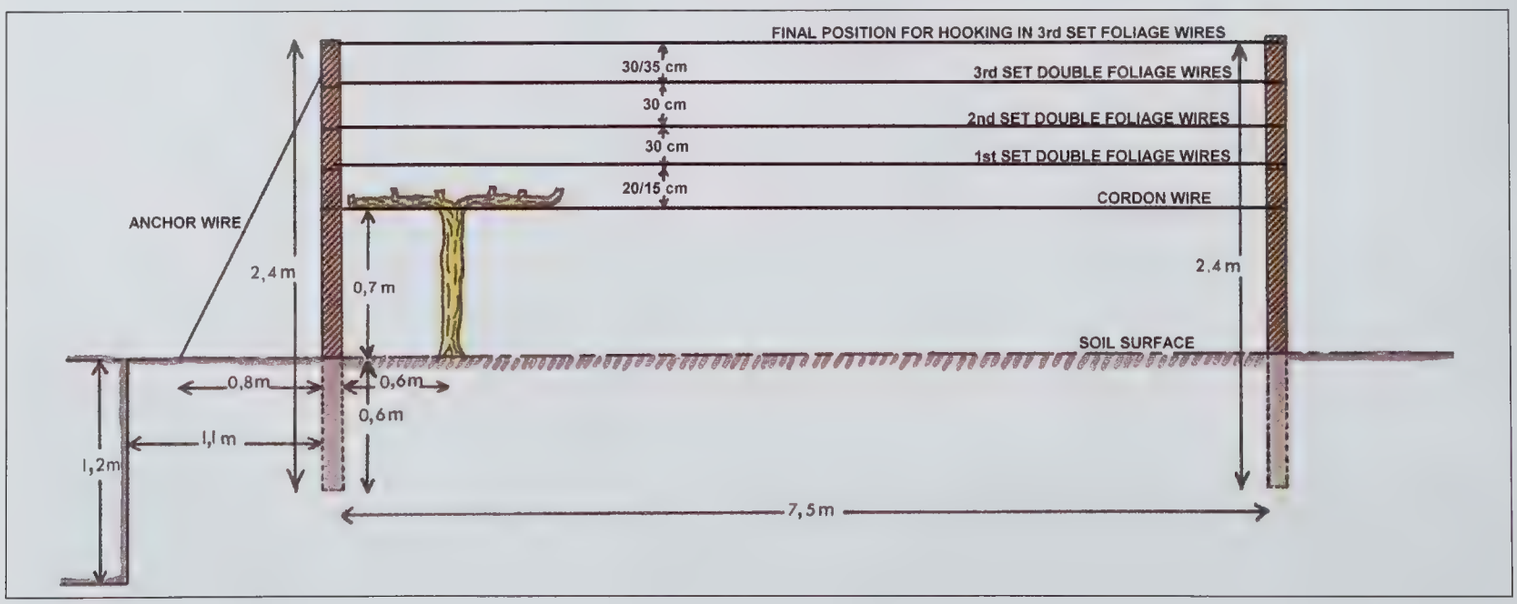



**Figure X. Seven wire hedge trellis with six movable canopy wires**

canopy wires must not be spaced more than 20 cm apart, and the whole pole must be used right to the top.

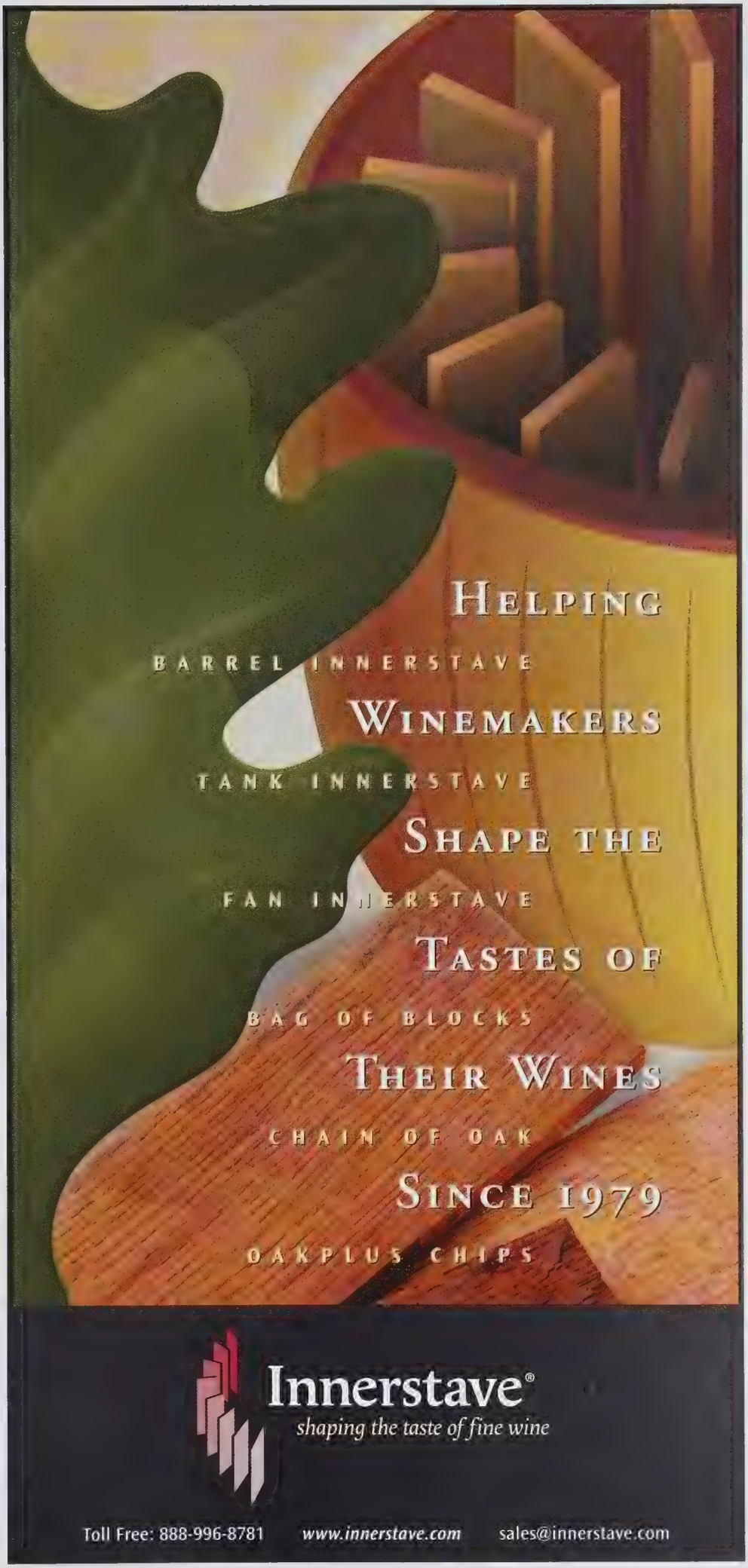
It is important for the bottom set of canopy wires not to be moved once they have been positioned, and it is often necessary, in instances where these wires are not rigid enough, to draw them closer with wire clamps. With this early movement, young shoots must be positioned between the wires. They are not moved again because that will cause tendril breakage and subsequently skew the shoots.

The only set of wires that changes position is the top set, which is moved to the top of the pole as soon as the shoots have grown about 15 cm past the pole height. By so doing, an extra 30 cm in the height of the canopy is ensured. The purpose of this is to achieve upright shoots in the canopy; all of which require timely tipping to the same height in order to obtain uniform shoot length. This will prevent slanted shoots with unhindered and uncontrollable growth in the canopy, while simultaneously ensuring that sufficient lateral shoots develop to carry younger leaves (Figure XI).

### *Balance between young and old leaves in the canopy*

It is well-known that the contribution made to bunch feeding by leaves aged more than 80 to 90 days starts to taper off. This means that, in South Africa, the contribution made to sustained ripening by leaves that unfolded in the second half of September and the first half of October, starts to decrease from the second half of December and the first half of January. These are the leaves in the cluster zone of the canopy, and this means that the leaves situated higher in the canopy (younger leaves) play a cardinal role during ripening.

Obviously, the time of full ripeness plays an important role, and this means cultivars that ripen later (such as Cabernet Sauvignon, Cabernet Franc, and Shiraz) must have more young leaves, percentage-wise, than early ripening cultivars.



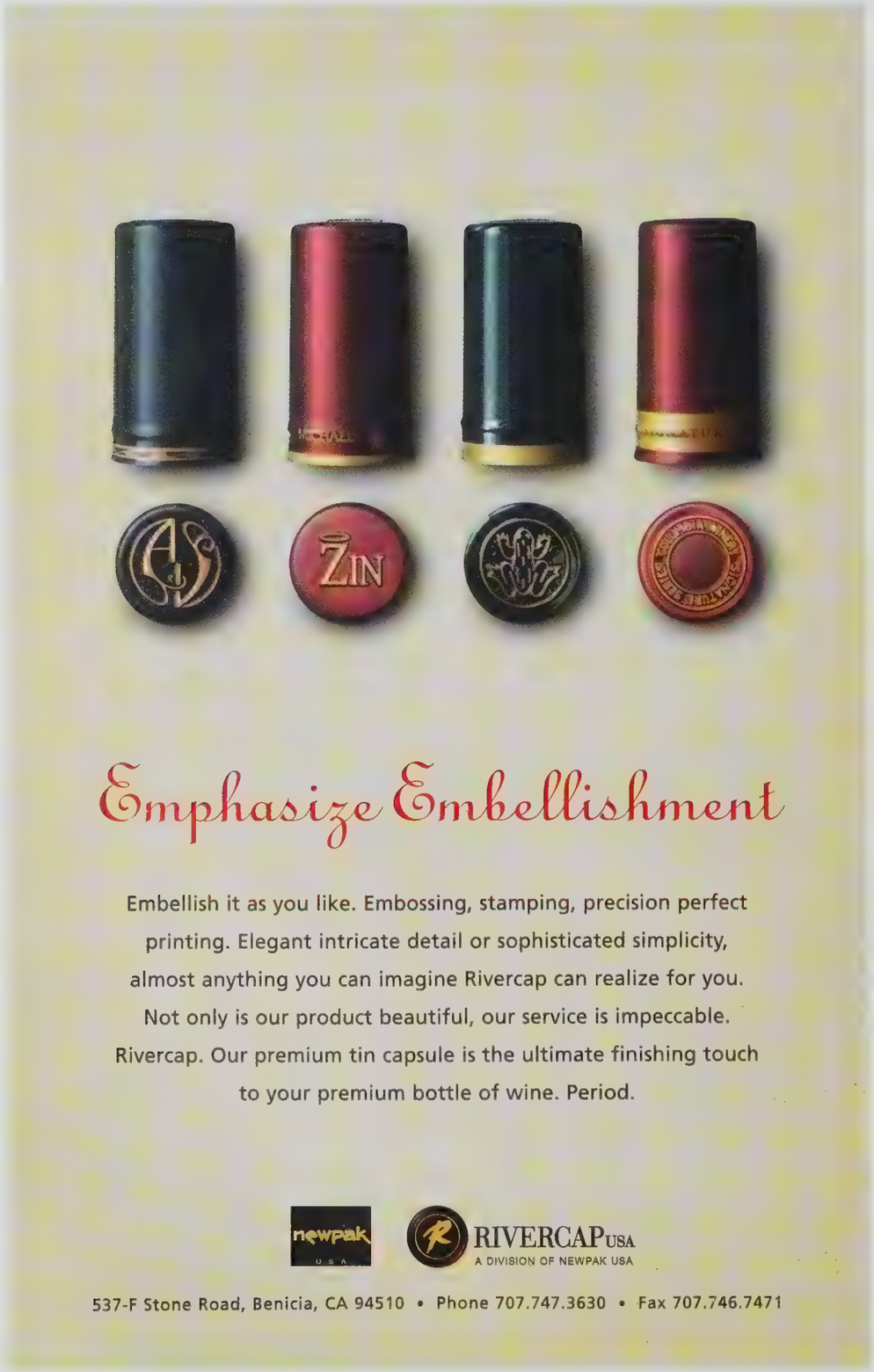
These young leaves are situated higher up on the primary shoot (for this to occur, the trellis system must be higher) and also on the lateral shoots.

For effective ripening in a Mediterranean climate, the ratio of main shoot leaf surface to lateral shoot leaf surface must be approximately 0.7.[3] This means that at the time of final ripening, the lateral shoot surface must be approximately 30% greater than the main shoot leaf surface.

Economics and mechanization prohibit excessively high trellis systems.

**Figure XII-A, B. Lateral shoots ensure sufficient young leaves to support ripening.**

Therefore, in order to achieve optimal ripening, it is very important to obtain and maintain lateral shoots (especially in late cultivars). This is particularly true in trellis systems that are too short to achieve efficient shoot length. For the same reason, very late topping is detrimental to optimal ripening, because, in most cases, it removes the most productive leaves. Therefore, timely, more regular tipping of primary shoots is beneficial because it results in formation of lateral shoots (more young leaves) earlier in the season (Figure XII).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Laterals are critical to the physiological functioning of a grapevine. It has been proven many times that a lateral without a cluster (second crop) — especially one in or near the cluster zone — contributes directly to cluster nutrition and that we get a lot of concentration from these laterals, especially during ripening.

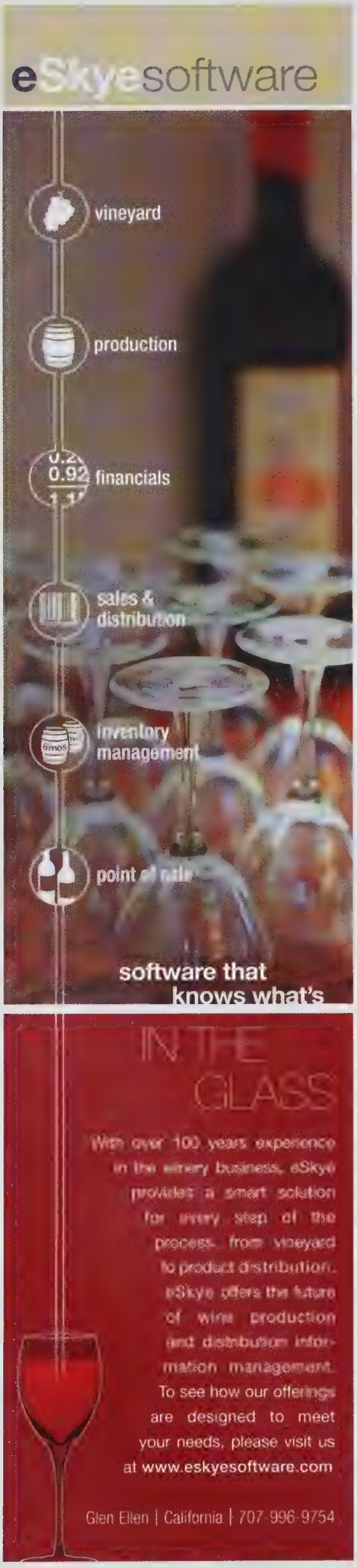
### *Conclusions*

To obtain a balanced vineyard, a strategic approach is required in which all practices are directed at inducing moderate growth. This entails all long- and short-term practices, but it is the former especially that requires careful planning to limit short-term input.

Three long-term practices, in particular, deserve special mention in this regard: rootstock choice, vine spacing, and choice of trellis system. The combination of a less vigorous rootstock, narrow inter-row spacing with a wide vine spacing in the row, and a trellis system that will accommodate and not limit the vigor plays a big role in creation of balanced vines with homogeneous shoot length. If the nutrition and irrigation programs of such vineyards are attuned to obtaining moderate growth, the battle to obtain balanced vines is halfway won.

Soil preparation has a direct impact on the balance between rootstock and scion growth. The trellis system affects the way this balance can be accommodated and maintained. Vine spacing and structure affect the balance between the left and right cordon arms.

The trellis system and pruning influence the balance between shoot growth and yield, while canopy management practices, together with the trellis system, have a direct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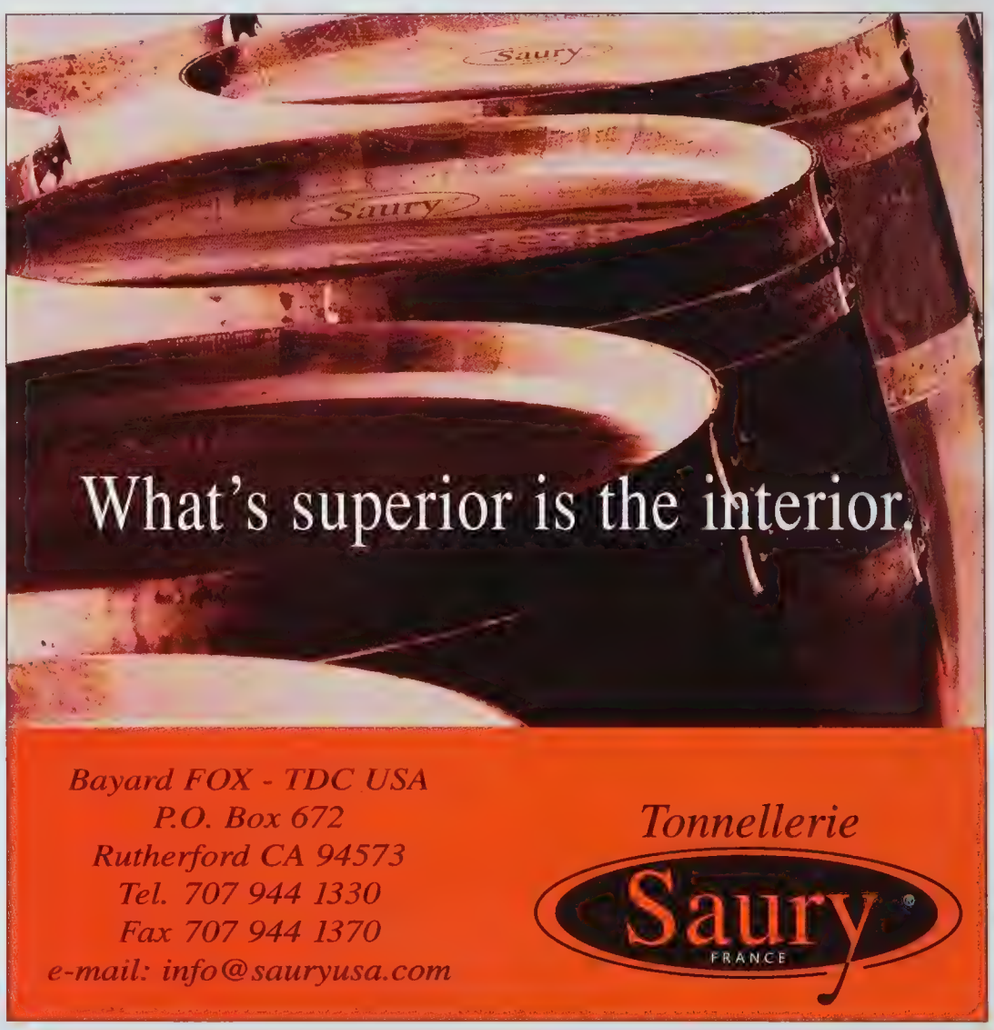


impact on the balance between young and old leaves in the canopy and root-diameter composition of the root system. This is why a total strategy is required to obtain balanced vines.

Balanced vines are the key to success, irrespective of the production goal. The only difference between vineyards that are managed for icon and/or ultra-premium wines on the one hand and standard and/or distilling wine on the other hand is that the relevant balances lie on different levels. ■

*Edited from "Vine Balance: Its importance to successful cultivation," February 2004,* Wynboer, *A Technical Guide for Wine Producers, incorporated in* Wineland, *magazine of the South Africa wine producers.*

**References**

1. Archer, E., 2001. *"Die verband tussen stokvormingspraktyke en druifgehalte."* Wynboer Tegnies. 145, 19–20.

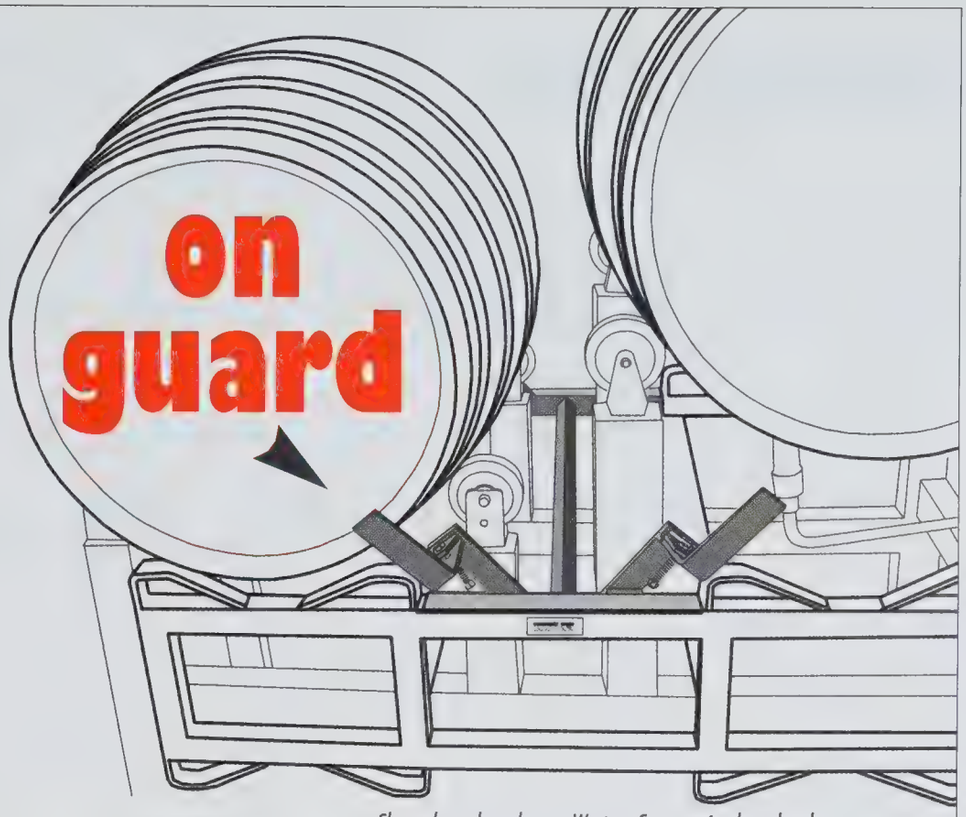
2. Hunter, J.J., 1998. "Plant spacing implications for grafted grapevines. Soil characteristics, root growth, dry matter partitioning, dry matter composition and soil utilization." *S. Afr. J. Enol Vitic.*, 19, 25–34.

3. Hunter, J.J., 2000. "Implications of seasonal canopy management and growth compensation." *S. Afr. J. Enol Vitic.*, 21, 81–91.

4. Hunter, J.J., and D.J. Le Roux, 1992. "The effect of partial defoliation on development and distribution of roots of *Vitis vinifera* L. cv. Cabernet Sauvignon grafted onto rootstock 99 Richter." *Am. J. Enol. Vitic.*, 43, 71–78.

5. Hunter, J.J., H.P. Ruffner, C.G. Volschenk, and D.J. Le Roux, 1995. "Partial defoliation of *Vitis vinifera* L. cv. Cabernet Sauvignon/99 Richter: Effect on root growth, canopy efficiency, grape composition and wine quality." *Am. J. Enol. & Vitic.*, 46, 306–314.

6. Southey, J.M., and E. Archer, 1988. "The effect of rootstock cultivar on grapevine root distribution and density." In: JL van Zyl (compiler) *The grapevine root and its environment.* 146pp Tech. Comm 215. Dept. Agric. Water Suppl.

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# Buttery attribute of wine—diacetyl Desirability, spoilage, and beyond

## BUTTER OR NO BUTTER

BY Eveline J. Bartowsky &
Paul A. Henschke
The Australian Wine Research Institute
Glen Osmond, SA, Australia

Diacetyl is a major flavor metabolite produced by lactic acid bacteria (LAB), including the wine-associated LAB, *Oenococcus oeni*, the preferred species for inducing malolactic fermentation (MLF). Diacetyl imparts a buttery aroma and flavor to many fermented foods and beverages.

In wine, diacetyl has important stylistic implications. The biosynthesis of diacetyl is dependent upon citric acid metabolism and diacetyl is an intermediate metabolite, that can be further reduced to acetoin and the polyol, 2,3-butanediol. Factors that can affect the formation and concentration of diacetyl in wine include the LAB and ML strain(s) present, wine chemical and physical parameters (pH, temperature, citric acid, sulfur dioxide, aeration), and yeast lees. By manipulating various winemaking conditions, it is possible to manage the diacetyl concentration of a wine.

### Metabolism of diacetyl

The diketone, diacetyl (2, 3-butanedione), is associated with the "buttery" character of wine and is formed as an intermediate metabolite in the reductive decarboxylation of pyruvic acid to 2,3-butanediol (Figure I). Pyruvic acid, when it is derived from the co-metabolism of sugar and citric acid, stimulates formation of 2,3-butanediol. This series of reactions contributes to the redox balance of cellular metabolism.

Yeasts also contribute to the diacetyl content of wine, but due to the highly reductive conditions that exist at the end of fermentation, the concentration of diacetyl is usually below its detection threshold.[14] The amount of diacetyl, and hence the buttery attribute in wine, can therefore be regarded to be relatively unstable when LAB microorganisms are present.

The formation and degradation of diacetyl is closely linked to the growth of ML bacteria and the metabolism of sugar, malic acid, and citric acid. The relationship between some of these parameters in a laboratory scale fermentation using a 1998 Barossa Valley Cabernet Sauvignon wine inoculated with the commercial *O. oeni* strain Lalvin EQ54 is shown in Figure IV.[2]

Due to the high inoculum of ML bacteria ( $5x10^6$ cfu/mL) produced by this preparation, malic acid degradation commenced immediately and the maximum rate of degradation coincided with the period of rapid bacterial growth. Citric acid metabolism commenced after approximately 25% of the malic acid had been degraded.

The diacetyl content of the wine increased to a maximum when approximately 95% of the malic acid had been converted to lactic acid and 75% of the citric acid had been consumed. When all of the citric acid had been metabolized, the concentration of diacetyl had decreased from its maximum value to about twice the initial concentration. With continued incubation, the final diacetyl concentration approximated the initial concentration.

### Sensory aspects of diacetyl

When present at a high concentration (exceeding 5 to 7 mg/L), diacetyl is regarded by many to be undesirable in the wine, whereas, at around 1 to 4 mg/L and depending on the style and type of wine, it is considered to contribute a desirable buttery or butterscotch flavor character.[7,18] The aroma threshold for diacetyl is dependent on the wine type and has been determined to vary from 0.2 mg/L for Chardonnay wine, 0.9 mg/L for Pinot

**Table I: Factors that can affect the diacetyl content of wine (adapted from Martineau et al., 1995b).[15]**

| Winemaking factors | Effect on diacetyl concentration and /or sensory perception |
|---|---|
| Malolactic bacterial strain | *O. oeni* strains vary in production of diacetyl |
| Wine type | Red wine versus white wine favors diacetyl |
| Inoculation rate of malolactic bacteria | Lower inoculation rate ($10^4$ vs $10^6$ cfu/mL) favors diacetyl production |
| Contact with active yeast culture (lees) | Yeast contact reduces diacetyl content of wine |
| Contact of wine with air during MLF | Oxygen favors oxidation of α-acetolactate to diacetyl |
| Sulfur dioxide content | • $SO_2$ binds diacetyl, which renders it sensorily inactive<br>• $SO_2$ addition inhibits yeast/bacteria activity and stabilizes diacetyl content at time of addition |
| Citric acid concentration | Favors diacetyl production, however, acetic acid is also produced |
| Temperature at which MLF is conducted | 18ºC versus 25ºC may favor diacetyl production |
| pH of wine at which MLF is conducted | Lower pH may favor diacetyl production |
| Fermentable sugar concentration | Conflicting information; residual sugar may reduce diacetyl production |

Noir to 2.8 mg/L for Cabernet Sauvignon wine.[14] The sensory perception of diacetyl in wine is also highly dependent upon the presence of other compounds present in the wine.[3,4]

The sensory perception of a flavor compound in wine may be influenced by the chemical constituents of the wine in which it is presented. This can be demonstrated by results of a survey of commercially finished Australian wines produced between 1992 and 1999 (36 Chardonnay and 29 Shiraz wines)[1,4,5] in which the sensory perception of diacetyl was positively correlated to the actual concentration in wine.[9]

For most of the Chardonnay wines, the diacetyl content was near the sensory threshold, whereas in all of the Shiraz wines the diacetyl content was below the sensory threshold (Figure II). From the sensory panel results, we can see that there is a range of buttery scores for wines with similar diacetyl content.

The buttery aroma, while significantly correlated with diacetyl concentration in

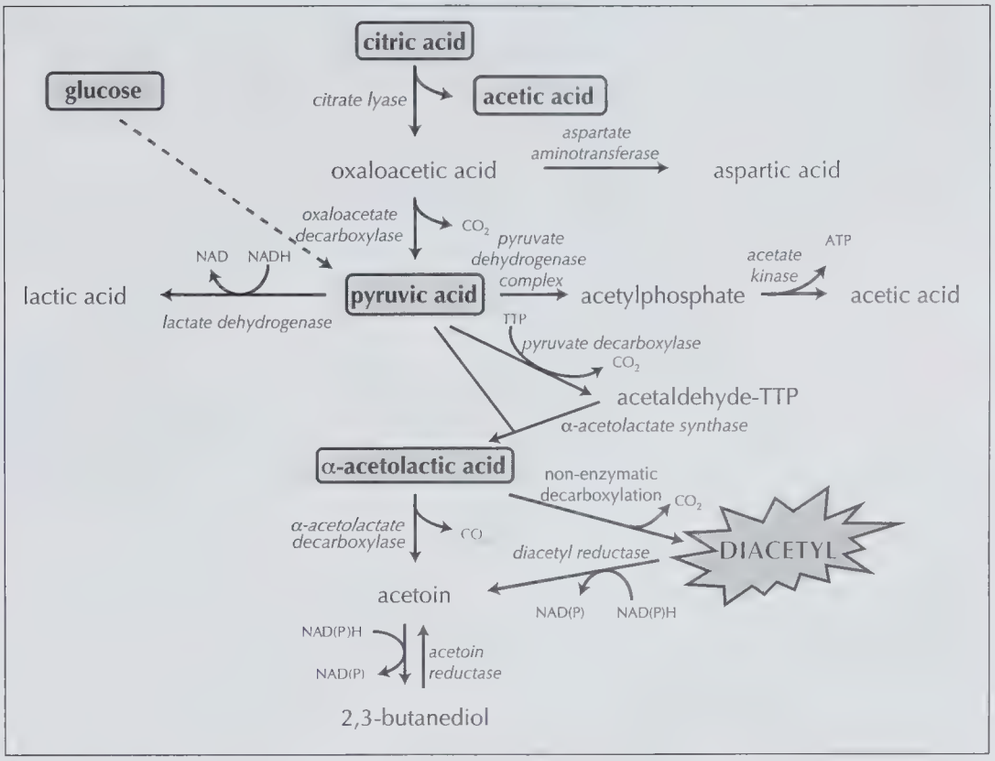


**Figure I: Pathway for citric acid metabolism by *Oenococcus oeni*.**

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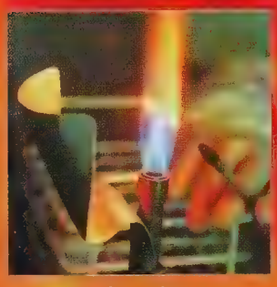

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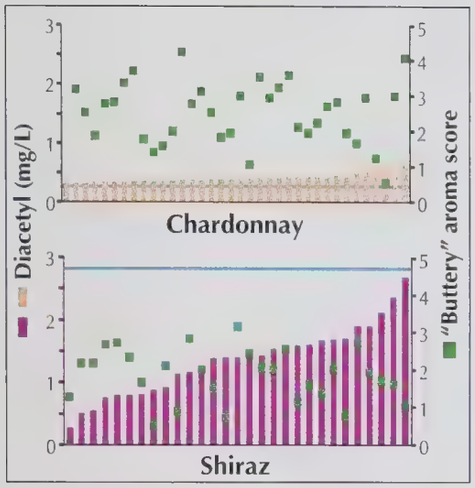


**Figure II: The diacetyl content and "buttery" sensory perception of Australian Chardonnay (36) and Shiraz (29) wines. The concentration of diacetyl in individual wines is ranked in order of those with the lowest to those with the highest. A trained sensory panel of 20 participants rated the "buttery" aroma score for the wines on a scale of 0 to 9 (0 indicated that the buttery attribute could not be perceived, while 9 was defined as high intensity). The line at diacetyl of 0.2 mg/L (Chardonnay) and 2.8 mg/L (Shiraz) indicates the reported sensory thresholds for diacetyl in these wines.**

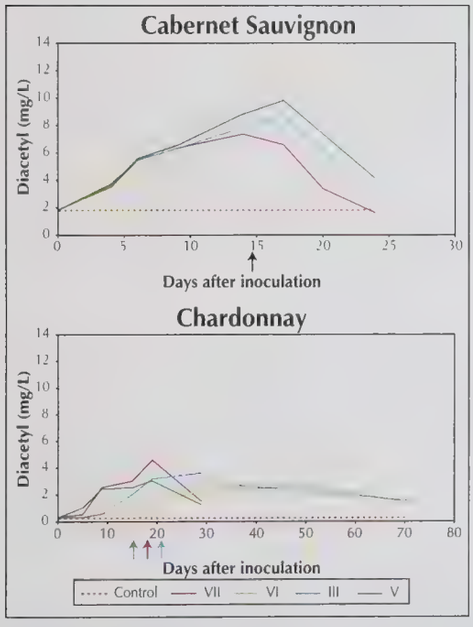


**Figure III: Diacetyl metabolism by four commercial *Oenococcus oeni* strains during malolactic fermentation in Cabernet Sauvignon and Chardonnay wine with similar chemical composition (12.5–13% v/v alcohol, pH 3.5, 2.5 g/L malic acid, 0.2 g/L citric acid). The arrows indicate the time at which all the malic acid was completely metabolized.**

the Chardonnay wines, was not predicted very well by the regression equation, but the prediction was improved when the free sulfur dioxide concentration of the wines was taken into account. There was a weak, although statistically significant, correlation between diacetyl concentration and buttery aroma scores for the red wine data set when the sulfur dioxide concentration was taken into account.

This weak correlation may have been due, in part, to the generally low concentration of diacetyl in relation to the published aroma threshold in red wine. These wines were of varying ages, styles and from different viticul-

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tural regions, so the presence of other wine flavor compounds is likely to have contributed to or modified the sensory impact of diacetyl.

### *Winemaking factors that can affect the diacetyl content*

A variety of factors, including some which are amenable to control by the winemaker, can greatly affect the concentration of diacetyl in wine, and are summarized in Table I.

*Malolactic bacterial strain*

The performance, growth, and metabolism of an *O. oeni* strain are very much dependent upon the chemical composition of a wine. Nevertheless, based on research conducted under various conditions in different winegrowing regions, certain malolactic bacterial strains have been observed to produce a higher residual concentration of diacetyl in wines than other strains.

In Figure III, the metabolism of diacetyl has been followed during and

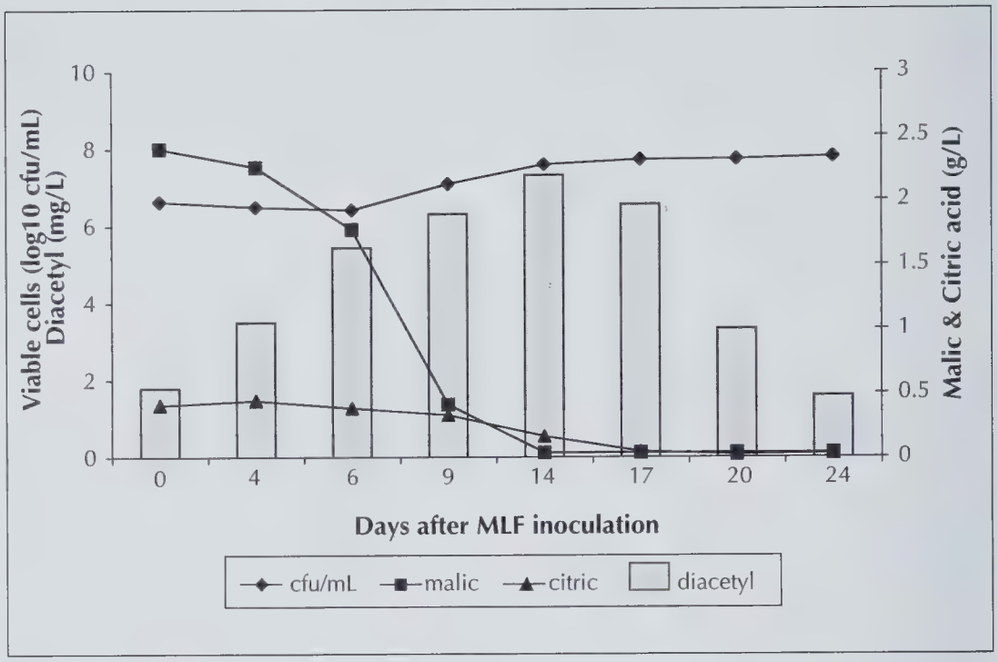


**Figure IV: Malolactic fermentation in Cabernet Sauvignon wine by commercial *Oenococcus oeni* strain Lalvin EQ54. Wine composition: residual sugar < 0.1 g/L, 2.6 g/L malic acid, 0.5 g/L citric acid, 12.5% v/v ethanol, 1.9 mg/L diacetyl, pH of 3.5. The bacteria starter culture was prepared and used according to manufacturer's recommendations.**

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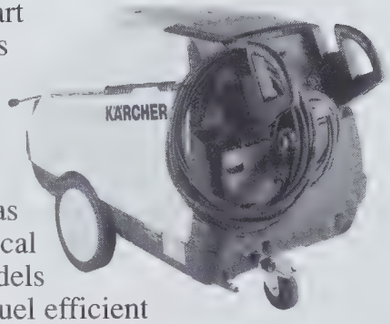


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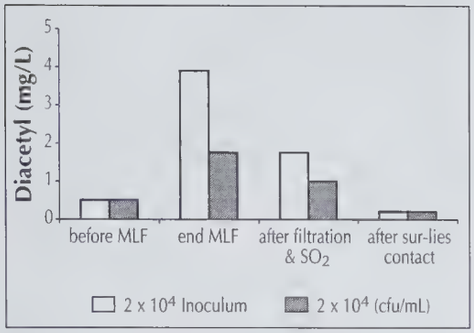



**Figure V: Diacetyl content of Pinot Noir wine with malolactic fermentation conducted by commercial *Oenococcus oeni* strain V with two different inoculation rates (adapted from Krieger et al., 2000).[12]**

after MLF in a Cabernet Sauvignon and Chardonnay wine of similar chemical composition with four commercial *O. oeni* strains. The overall total diacetyl synthesized by the *O. oeni* strains is higher in the red wine, which has also been previously noted in the diacetyl sensory study (Figure III). There is variation in the diacetyl peak concentration with each of the *O. oeni* strains.

### *Inoculation rate of malolactic bacteria*

The inoculation dosage of bacteria markedly affects the time for induction and completion of MLF. Contemporary commercial cultures typically deliver 0.5 – 5 x $10^6$ cfu/mL bacteria when prepared and inoculated as recommended. However, a

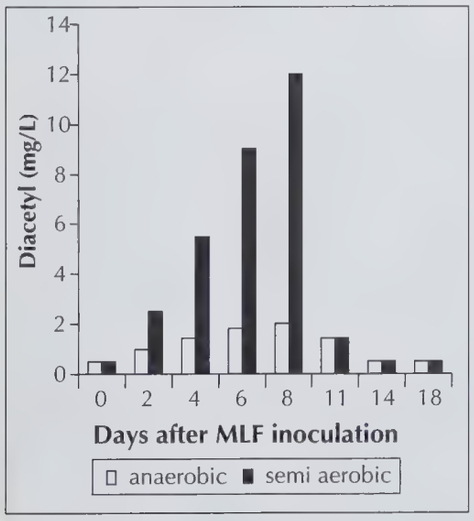
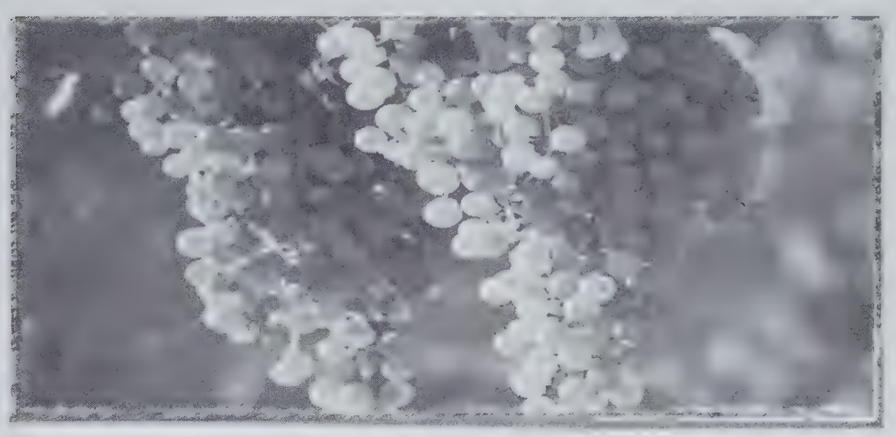



**Figure VI: Effect of anaerobic and semi-aerobic conditions on diacetyl metabolism during MLF in Chardonnay wine. MLF *Oenococcus oeni* strain VII (adapted from Nielsen and Richelieu, 1999).[17]**



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transient decline in the viable population often occurs upon inoculation due to delayed adaptation to the chemically-harsh conditions (for example, low pH and high sulfite and ethanol concentration) of a wine. Bacterial growth may approach $10^8$ cfu/mL under favorable conditions.

Significant malate degradation is not observed until the viable population reaches $0.5 - 1 \times 10^6$ cfu/mL, and a high rate of degradation is associated with a rapidly growing culture.[11] Several researchers, A. Lonvaud-Funel and S.A. Krieger, observed that a lower inoculation rate, such as in $10^4$–$10^5$ cfu/mL, can result in higher diacetyl accumulation in wine.[12,13]

Observations made from a winery trial illustrate this point with *O. oeni* strain V and a Pinot Noir wine (Figure V). After MLF-completion, the wine inoculated with $2 \times 10^4$ cfu/mL bacteria had an eight-fold increase in diacetyl, whereas the wine inoculated at $2 \times 10^6$ cfu/mL diacetyl only increased three-fold. The increased final diacetyl content of the wine inoculated at the lower dosage is likely due to the extended growth and fermentation period.

Also illustrated in Figure V, is the impact of yeast lees and extended wine contact on diacetyl concentration. As *Saccharomyces cerevisiae* wine yeasts are capable of synthesizing diacetyl and degrading it, the presence of yeast lees, especially when stirred, can further reduce the wine diacetyl content.

### *Impact of air (oxygen) on diacetyl formation*

Malolactic fermentation in wine is essentially an anaerobic process whereby wine contact with air (oxygen) is kept to a minimum, mainly to prevent oxida-

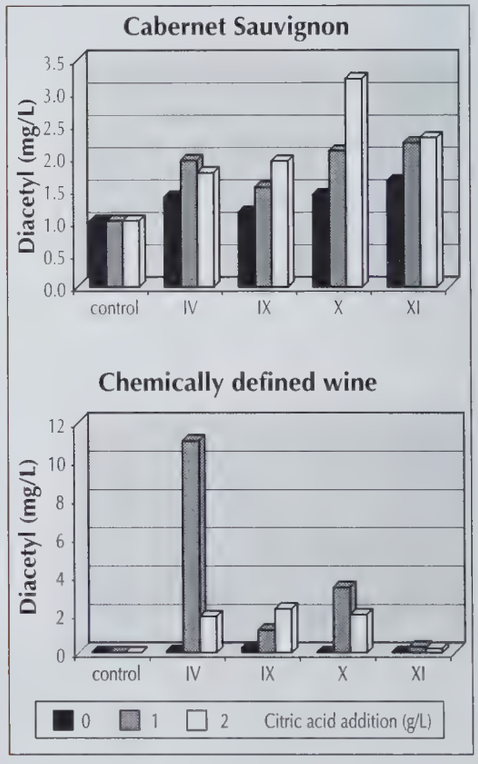


**Figure VII: Effect of different concentrations of citric acid on the diacetyl content of Cabernet Sauvignon wine and chemically defined wine (10% v/v ethanol, pH 3.5) after MLF with four different, coded *O.oeni* strains [IV, IX, X, XI] (Burvill, 1996).[6]**

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tion of the wine and the growth of spoilage bacteria and film-forming yeasts. The conversion of α-acetolactate to diacetyl is a non-enzymatic decarboxylation (Figure I) that is enhanced by the presence of oxygen.

The enhancing effect of a limited exposure of wine to air during MLF with *O. oeni* strain VII in a Chardonnay wine is shown in Figure VI.[17] Although the degradation of malic and citric acids and cell growth were not greatly affected by limited exposure to air, the amount of diacetyl that accumulated in the wine varied greatly, with the formation of 2 mg/L under anaerobic conditions and 12 mg/L under semi-aerobic conditions.

*Citric acid content of wine*

Citric acid, a grape-derived organic acid, is commonly present in wine in the range of 0.1 to 0.7 g/L and most strains of *O. oeni* are able to metabolize this acid during MLF (pathway shown in Figure I). The metabolism of citric acid is normally delayed relative to that of malic acid, and consequently its depletion from wine may not occur until after malic acid depletion (Figure II).

Higher peak concentrations of diacetyl generally correlate with an elevated concentration of citric acid (Figure VII). However, the magnitude of the relationship depends on many other factors. Addition of citric acid to grape must or wine for the purpose of evaluating diacetyl accumulation should be approached with caution.

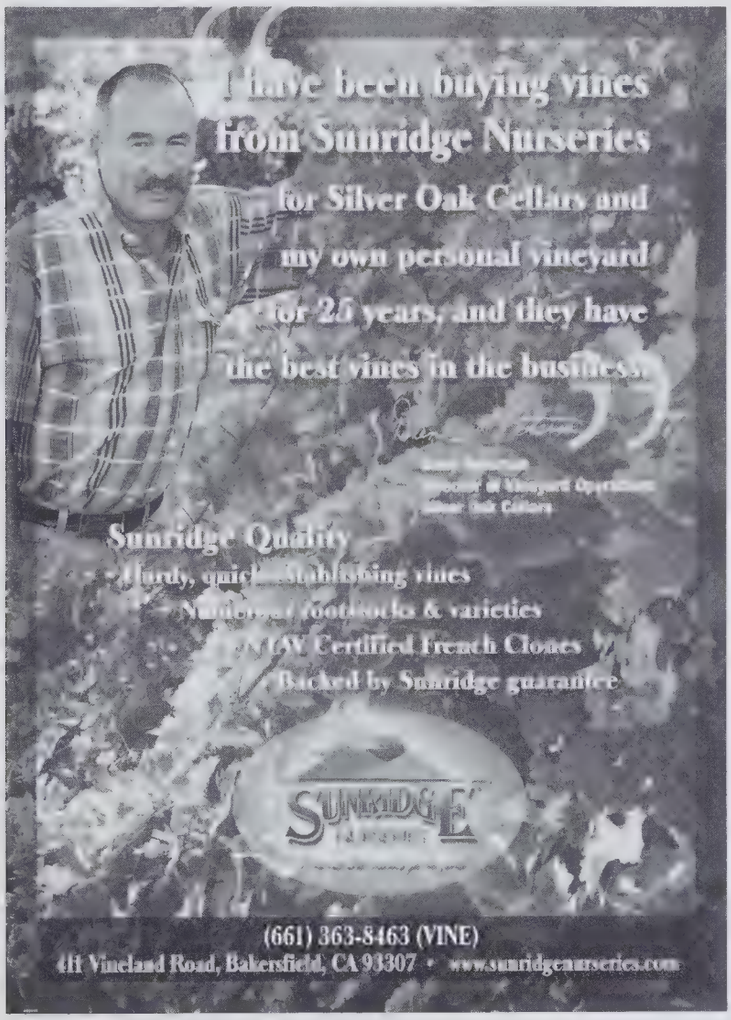
Even though an addition of citric acid to wine can be accompanied by an increase of diacetyl, the formation of other flavor metabolites, particularly acetic acid, can also result.[10] Citric acid addition will affect the titratable acidity (TA), and as some yeasts are also capable of metabolizing this acid, unexpected changes in the concentration of diacetyl and TA could result.

*Temperature at which MLF is conducted*

Although ML bacteria have a growth optimum temperature in laboratory media of approximately 27ºC, growth in wine is restricted to the range 15º to 25ºC with an optimum for most *O. oeni* cultures around 20º to 22ºC. MLF conducted at lower temperatures, such as 18ºC rather than 25ºC, tends to be slower, but wines accumulate a higher concentration of diacetyl (Figure VIII).

*Sulfur dioxide and diacetyl*

Sulfur dioxide ($SO_2$) has complex roles in the winemaking process, including antioxidant and antimicrobial properties. It is able to interact with carbonyl compounds, including acetaldehyde and diacetyl in a reversible manner (Figure IX-A). In the presence of $SO_2$, the concentration of free diacetyl in wine is lowered, however as the $SO_2$ content decreases, as for example during ageing, the ratio of free diacetyl will increase again, thus increasing its sensory impact (Figure IX-B).[17]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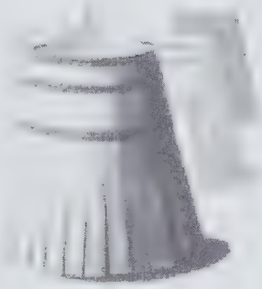

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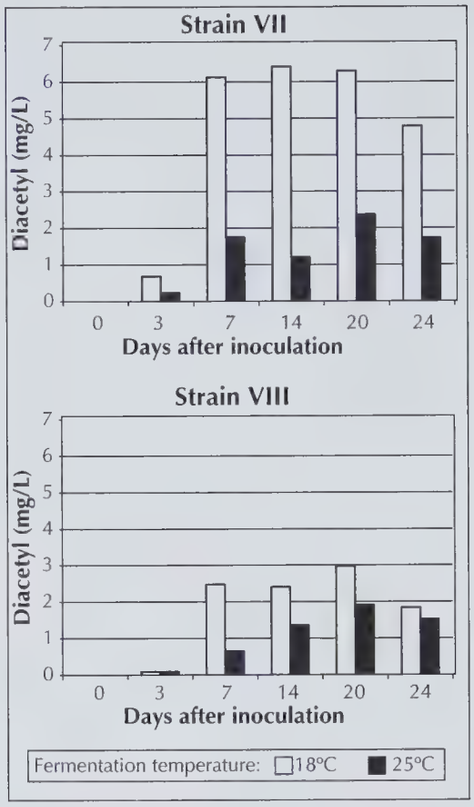


**Figure VIII: Diacetyl concentration in chemically defined wine (11% v/v ethanol, pH 3.5) during MLF conducted by *O.oeni* strains VII and VIII (Hart, 1997).[8]**

*Duration of MLF*

The duration of MLF is dependent upon numerous factors, including bacterial strain, chemical composition of the wine, and wine temperature. Wines which undergo a prolonged MLF, for whatever reason, tend to have a higher diacetyl content (Figure X).

Three Cabernet Sauvignon wines sourced from different Australian viticultural regions were inoculated for MLF with commercial *O. oeni* strain VII and the diacetyl content was determined at the end of MLF (Figure X-A).

A Chardonnay wine that underwent MLF with five different ML strains showed varying lengths of MLF, and final concentrations of diacetyl (Figure X-B).[3] In both examples, the highest diacetyl concentration was observed in the wines that had the longest MLF duration.

***Summary***

There are numerous factors that can influence the diacetyl content and, hence, the buttery character of wine. Therefore, in order to achieve a particular buttery level, it is necessary to combine a number of factors that are either favorable or not to diacetyl content. The starting point is to choose the most appropriate ML bacteria strain for conducting the MLF, and then consider the wine composition and MLF conditions.

Increasing the buttery diacetyl impact of a wine can be achieved by using a lower than usual inoculum of a high diacetyl-producing strain in the absence of active yeast, such as after racking wine off yeast lees. The diacetyl content should then be stabilized by filtration to remove bacteria (and yeast if present) to prevent remetabolism, and the addition of sufficient $SO_2$ to prevent further microbial activity.

Use of citric acid to augment diacetyl content entails the risk of acetic acid production, and limited air contact also needs great care. As it might be difficult to achieve the desired level of impact through the MLF process, blending a portion of wine made with a high diacetyl content with the remainder

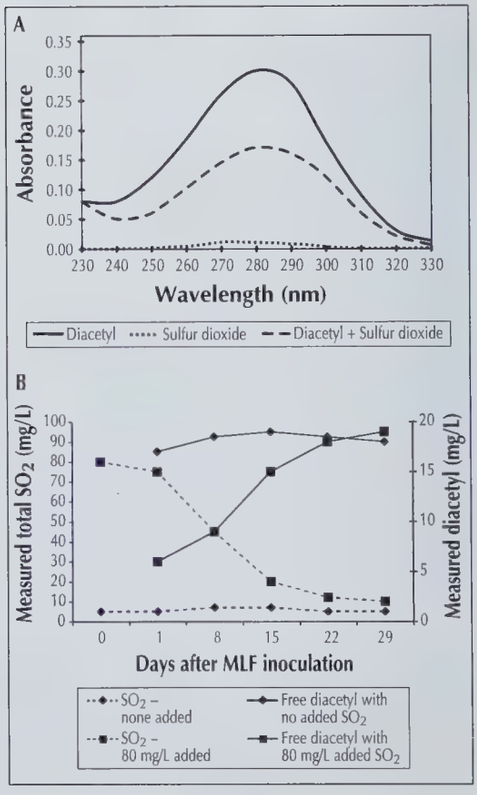


**Figure IX: Interactions between sulfur dioxide ($SO_2$) and diacetyl. (A) Absorbance of 10% aqueous ethanol solution with the addition of either 1 mg/L diacetyl, 5 mg/L $SO_2$ or 1 mg/L diacetyl + 5 mg/L $SO_2$ (Hart, 1997). (B) Effect of storage time on diacetyl and total $SO_2$ concentrations in Chardonnay wine with an initial 20 mg/L of diacetyl and addition of 80 mg/L $SO_2$ (adapted from Nielsen and Richelieu, 1999).[17]**

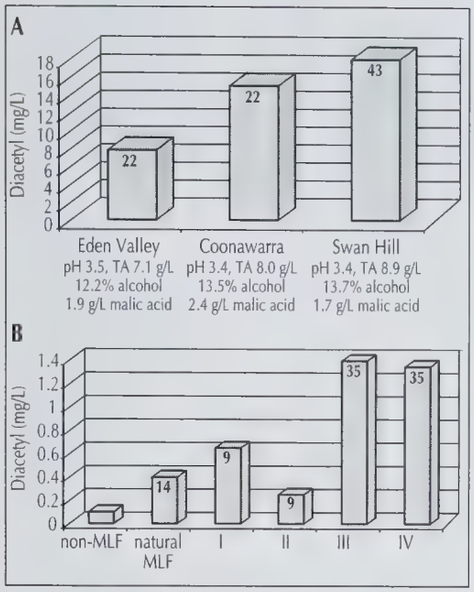


**Figure X: Duration of malolactic fermentation (days: 22, 22, 43 in A; 14, 9, 9, 35, 35 in B)) and its effect on final diacetyl concentration. (A) In three Cabernet Sauvignon (2000) wines sourced from different viticultural regions and inoculated with *O. Oeni* strain VII (McCarthy, 2000).[16] (B) In a Chardonnay wine (Langhorne Creek, 2001; pH 3.3, TA 5.8 g/L, 12.5% v/v alcohol, 2.1 g/L malic acid, 0.2 g/L citric acid) with five MLF treatments.**

would facilitate achievement of the required level. A low diacetyl content can be achieved by using an appropriate strain inoculated during the late stage of the alcoholic fermentation, and, if necessary, maintaining the wine on stirred lees until the diacetyl becomes undetectable. ■

**Acknowledgments**

This text has been adapted from a recent review on this topic.[5] The "buttery" attribute of wine — diacetyl — desirability, spoilage and beyond. *Int. J. Food Microbiol.* (96: 235–252)]. Thanks to Jane McCarthy, Peter Costello, Tim Burvill, Allen Hart, and Helen McCarthy for their contributions to the AWRI – MLF program. Professor Peter Høj is thanked for supporting this project and Professor Sakkie Pretorius for valuable comments on this text. This project is supported by Australia's grapegrowers and winemakers through their investment body, the Grape and Wine Research and Development Corporation, with matching funds from the Australian Government.

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**References**

1. Bartowsky, E.J., T.B. Burvill, and P.A. Henschke. 1997. "Diacetyl in wine: role of malolactic bacteria and citrate." *Aust. Grapegrower & Winemaker.* 402a: 130–135.

2. Bartowsky, E.J. and P.A. Henschke. 2000. "Management of malolactic fermentation for the "buttery" diacetyl flavour in wine.: *Aust. Grapegrower & Winemaker.* 438a: 58–67.

3. Bartowsky, E.J., P.J. Costello, and P.A. Henschke. 2002a. Management of malolactic fermentation — wine flavour manipulation. *Aust. & N.Z. Grapegrower & Winemaker.* 461a: 7–12.

4. Bartowsky, E.J., I.L. Francis, J.R. Bellon, and P.A. Henschke. 2002b. "Is buttery aroma perception in wines predictable from diacetyl concentration?" *Aust. J. Grape Wine Res.* 8: 180–185.

5. Bartowsky, E.J. and P.A. Henschke. 2004. "The 'buttery' attribute of wine — diacetyl — desirability, spoilage and beyond." *Int. J. Food Microbiol.* (96; 235–252).

6. Burvill, T.B. 1996. "Quantification of diacetyl in wine." *Oenology Honours thesis.* Adelaide, Australia: The University of Adelaide.

7. Davis, C.R., D. Wibowo, R. Eschenbruch, T.H. Lee, and G.H. Fleet. 1985. "Practical implications of malolactic fermentation: a review." *Am. J. Enol. & Vitic.* 36: 290–301.

8. Hart, A. 1997. "The influence of malolactic fermentation on the concentration of diacetyl by individual strains of *Oenococcus oeni." Oenology Honours thesis.* Adelaide, Australia: The University of Adelaide.

9. Hayasaka, Y. and E.J. Bartowsky. 1999. "Analysis of diacetyl in wine using solid-phase microextraction combined with gas chromatography-mass spectrometry." *J. Agric. Food Chem.* 47: 612–617.

10. Henick-Kling, T. and Y.N. Park. 1994. "Considerations for the use of yeast and bacterial starter cultures: sulfur dioxide and timing of inoculation." *Am. J. Enol. & Vitic.* 45: 464–469.

11. Gockowiak, H. and P.A. Henschke. 2003. "Interaction of pH, ethanol concentration and wine matrix on induction of malolactic fermentation with commercial 'direct inoculation' starter cultures." *Aust. J. Grape Wine Res.* 9: 186–193.

12. Krieger, S.A., E. Lempere and M. Ernst. 2000. "Management of malolactic fermentation with regard to flavour modifi cation." Session 3B, Flavour modification in the winery: Microbiological. In: *Proceedings of 5th International Symposium on Cool Climate Viticulture and Oenology* 16–20 January, 2000, Melbourne, Australia.

13. Lonvaud-Funel, A., C. Zmirou and F. Larue. 1984. *"Le métabolisme de l'acide citrique par les bactéries lactiques de la fermentation malolactiques des vins." Sci. Aliments* 4: 81–85.

14. Martineau, B., T.E. Acree, and T. Henick-Kling. 1995a. "Effect of wine type on the detection threshold for diacetyl." *Food Res.* In. 28: 139–143.

15. Martineau, B., T. Henick-Kling, and T.E. Acree. 1995b. "Reassessment of the influence of malolactic fermentation on the concentration of diacetyl in wines." *Am. J. Enol. & Vitic.* 46: 385–388.

16. McCarthy, H. 2000. "Evaluations of the ability of the chemical sensor to determine the aroma profiles of wines which have undergone malolactic fermentation." *Oenology Honours thesis.* Adelaide, Australia: The University of Adelaide.

17. Nielsen, J.C. and M. Richelieu. 1999. "Control of flavor development in wine during and after malolactic fermentation by *Oenococcus oeni. Appl. Environ. Microbiol."* 65: 740–745.

18. Rankine, B.C., J.C.M. Fornachon, and D.A. Bridson. 1969. "Diacetyl in Australian dry red wines and its significance in wine quality." *Vitis* 8: 129–134.

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PART II — MONITORING AND SCHEDULING

# Integrated irrigation of California winegrapes

BY **Mark Greenspan, Ph.D.,**
**Viticulture research manager**
**Gallo of Sonoma, Healdsburg, CA**

If sections A and B (March/April–2005 *PWV*) represent the scientific or mechanical component of integrated irrigation, this section represents the *art* of irrigation management. This means that as in all art, there is no "correct" approach — no one best way to do it. Also, this is the aspect of irrigation that is currently undergoing tremendous research efforts, so, to date, there are only fuzzy connections between irrigation deficit strategies and wine styles.

The best lessons learned thus far are to approach irrigation cutbacks carefully, because going overboard can be economically disastrous. We used to refer to irrigation strategy simply as deficit irrigation strategy, but that is not strictly correct. In fact, an effective irrigation strategy could very well avoid any water stress whatsoever.

### C. Irrigation Strategy

#### *What is deficit irrigation?*

Section A described how to approach irrigation scheduling by delivering the same amount of water to a vineyard as has been extracted by the vines. This is commonly referred to as irrigating to "full ET." In many cases, irrigating to full $ET_c$ is better than current practice if current practice happens to be irrigation without the use of $ET_c$ for scheduling. Irrigating to full ET is a good first step before venturing into deficit irrigation territory. (The same could be said for switching from the "older" set of grapevine crop coefficients to the newer model of crop coefficients that will prescribe less irrigation.)

However, if a grapevine receives all of the water it wants, it will focus most of its energy on growing shoots and leaves. As the vine begins to attain its full canopy (about four-foot long shoots or 20 to 22 nodes), we want to manage the vine to turn its attention away from vegetative growth and toward reproductive (fruit) development. To accomplish this, we "trick" the vine into thinking that it is running out of water. This is done through deficit irrigation — application of less than full $ET_c$ during specific portions of the growing season.

Deficit irrigation is frequently referred to as regulated deficit irrigation (RDI), though "regulation" simply refers to scheduling and monitoring.

By applying less than full $ET_c$, the soil moisture is depleted over time as the vine removes more water from the soil than is being replaced. As described in section B, as soil moisture depletes, it is harder for the vine to extract the water (a dryer sponge), so the water potential of the sap becomes more and more negative (the suction pressure increases). Changes in water potential create physiological changes in the vine, many of which we can use to our advantage.

#### *Key factors*

While some viticulturists have focused on full-season irrigation deficits (throughout fruit development), in my experience it is more beneficial to practice short-term moderate deficit irrigation. It is *never* advisable for a vineyard to express water-deficit stress during bloom and fruit set, as entire clusters may be aborted as a result of stress at that time.[1] Nor is it wise to stress vines after harvest, when the vineyard has an opportunity to store carbohydrates produced in photosynthesis in the permanent vine structure.[2]

**Left: Wine from properly irrigated vines. Right: Wine from over-irrigated vines.**

Based on work done by Mark Matthews,[3] the two appropriate periods for deficit irrigation are pre-veraison (between fruit set and veraison) and post-veraison (between veraison and harvest). There is a dramatic change in the water relations of the fruit at veraison, and it stands to reason that there would be differences in the effects of irrigation deficit before or after veraison.[4]

The most direct and noticeable effects of water deficit that we want to take advantage of are the restrictions on shoot growth and berry growth. Both of these processes can be affected between the fruit set- to-veraison stages of development by carefully monitoring pre-veraison irrigation deficits. However, while the buzz in the industry seems to be focusing on the practice of pre-veraison irrigation deficit, we have found some benefit to post-veraison irrigation deficits also. Grape variety is very important when deciding which tactic to choose.

Moderation is the key to success for irrigation management. Deficit irrigation has become a dirty word to some growers primarily because the concept was carried to excess with resulting crop and/or quality loss. Irrigation deficits must be applied such that vine stress does not impact vine health or productivity. This means that careful irrigation management can help avoid leaf abscission, overexposure of fruit to the sun or berry-shrivel symptoms. It also means that shoot growth monitoring and pressure chamber measurements are important practices that allow us to preemptively modify our irrigation levels to prevent leaf or fruit loss.

### *Pre-veraison deficits*

Pre-veraison irrigation deficits and/or delayed irrigation initiation are tools that can and should be used to reduce vegetative growth in order to achieve a balanced vine. While the definition of a balanced vine is beyond the scope of this discussion, suffice it to say that we need to develop a sufficient number of leaves to ripen the fruit and to protect the fruit from overexposure to sunlight.

Generally speaking, shoots that are about 38 to 48 inches long have sufficient foliage to mature a crop in a growing season. Growth beyond this amount can reduce wine quality by producing undesirable vegetative flavors, by reducing color development in red varieties, and increase fungal disease pressure on the fruit. It can also reduce yield by lowering bud fruitfulness. These problems are exacerbated if there is prolific lateral shoot growth, which generally results from excessive water availability.

Excessive vine growth also adds expense through the costs of hedging, slower hand-harvesting, and potential vine damage from machine-harvesting. On the opposite extreme, however, ceasing shoot growth before a sufficient canopy is developed creates problems with fruit over-exposure, retarded sugar accumulation during ripening, and a reduction in vine health and productivity from lower carbohydrate production and storage.

Irrigation management strategies are frequently employed to control vegetative growth. Irrigation initiation is a decision that needs to be made regardless of whether a deficit irrigation strategy is used. The decision about when to begin irrigating is probably the most critical with respect to vine vigor control. There are essentially two irrigation strategies that can be employed to control shoot elongation: 1) "standard" irrigation initiation followed by pre-veraison deficit, or 2) delayed irrigation initiation followed by full irrigation.

In the first strategy (pre-veraison deficit), irrigation is started before the vines become stressed, when they just start to show signs of slowing growth. This means that irrigation is initiated at about –9 to –10 bars of water potential when the shoot tip rating is about a 2 (Figure III). Once the irrigation program has started, a deficit level of application is maintained.

The actual percentage (of full $ET_c$) value cannot be explicitly recommended — it should be tested through trial and error. Begin with moderate deficits, say 80% to 90% of full $ET_c$. Deficits below 50% are dangerous and should not be attempted without small-scale experimentation. The keys are to use the pressure chamber consistently and to aim for a target level of water deficit stress by veraison. The water potential trend should look

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something like the pre-veraison deficit curve in Figure I.

In a pre-veraison deficit program, irrigation is increased to nearly 100% of $ET_c$ from veraison to harvest to relieve water stress or to prevent a further increase in vine stress and to maintain vine metabolism.

The second vigor control strategy, delayed irrigation initiation reduces vine vigor by delaying the initial irrigation application until shoot growth has slowed substantially or has ceased (shoot tip rating of 3). This corresponds to a leaf water potential of –11 to –12 bars.

Once shoot growth ceases, it will not resume unless the vine is irrigated to excess levels. Therefore, this approach should be followed using something slightly below full $ET_c$ until veraison. Note that after veraison, shoot growth is less likely to resume due to the substantial demand on carbohydrates from the ripening fruit.

What are the relative advantages of the two vigor-controlling irrigation approaches? Both are excellent strategies for achieving a balanced vine, and both will show dramatic quality improvements over a do-nothing approach. However, the pre-veraison deficit strategy requires more intensive management and experimentation than does the delayed initiation strategy. This is a significant consideration if resources are limited.

On the positive side, a pre-veraison deficit strategy helps reduce fruit expansion, resulting in smaller berries at harvest. It is widely thought that small berries have a large effect on wine style. However recent work has shown that, under water deficit, there are physiological factors that increase the concentration of skin tannin and anthocyanin (color pigment) in the berry, apart from the effect on berry size.[5] Regardless, pre-veraison deficits create a wine with greater structure and color density — a "bigger" wine. However, small berry size is undesirable for both white wines and elegant-style red wines.

Generally, the delayed irrigation initiation strategy will not have as great an effect on berry size as an pre-veraison deficit strategy. However, this depends on how long irrigation initiation is delayed. If it is delayed past fruit set, it could have a significant effect on berry size, as berry growth is highly sensitive to water deficits early in its development.

In general, the delayed irrigation initiation strategy is more desirable for white varieties and for lighter-style red wine varieties (to control shoot elongation), while the pre-veraison deficit strategy is appropriate when a more intensely colored and structured red wine is the goal. Whatever the strategy, remember that the vines must not be stressed (less than –10 bars) during fruit set or you will be very disappointed!

Pre-veraison deficit irrigation strategy is most beneficial for larger-berried varieties. In experiments at Gallo of Sonoma, moderate pre-veraison deficits have

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**Table I: Pre-veraison deficit irrigation strategies**

| Variety | Veraison Target LWP | Veraison – Harvest Level LWP |
|---|---|---|
| Syrah | –15 to –16 bars | –13 to –14 bars |
| Zinfandel | –14 bars | –14 bars |
| Merlot | –12 to –13 bars | –10 to –11 bars |

improved wine quality for Zinfandel, Syrah, and Merlot. It has not had much impact on small-berried varieties, most notably Cabernet Sauvignon.

The advisable levels of deficit stress varies by variety. We generally aim to achieve a particular target leaf water potential value by the time of veraison, followed by a "maintenance" level of water potential from veraison through harvest. Some values that we have found effective are in Table I.

Unlike the irrigation strategies outlined above, the post-veraison deficit (veraison to harvest) irrigation approach is geared toward affecting wine style more than for reducing vine vigor. However, in low-vigor sites, vigor reduction may not be the primary goal of irrigation management, and a post-veraison deficit strategy might be a desirable approach for at least a portion of the vineyard.

We have found that post-veraison deficits tend to accentuate ripe flavors in a wine, which might be useful in producing wine with ripe character without having to resort to excessively long hang times. Post-veraison irrigation deficits have shown promise for Cabernet Sauvignon and Zinfandel varieties. Some mid-day leaf water potential values that we have found effective are in Table II.

The xylem vascular connection to the fruit is not very functional during ripening,[4] so moderate post-veraison irrigation deficits will have less of a direct impact on berry size than will pre-veraison deficits. However, since the fruit is supplied with phloem sap during ripening, excessive stress on the vine can reduce the berry water supply through reduction in photosynthesis.

Fruit that begins to shrivel will usually not regain its turgor even if irrigation is poured back on. This may dramatically impact both yield and wine quality, as the shriveled fruit will contribute a raisiny, overripe character to the wine.

As for vine health, post-veraison deficits that reduce the photosynthesis of a vine and/or cause leaves to drop will reduce the amount of carbohydrate that is stored in the wood during the dormant season, thereby reducing vigor the following year. That is why post-veraison deficits require moderation and that a great deal of attention be paid to vine water status.

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Vineyards with post-veraison irrigation deficits should be monitored, preferably with a pressure chamber, so that water potentials do not fall below –15 bars at any time (–14 bars for more conservative strategies). Zinfandel seems to be an exception to that rule, and it can take –15 to –16 bars without severe fruit shrivel.

**Table II: Post-veraison deficit irrigation strategies**

| Variety | Pre-Veraison Level LWP | Harvest Target LWP |
|---|---|---|
| Cab. Sauvignon | –10 to –11 bars | –14 to –15 bars |
| Zinfandel | –11 to –12 bars | –15 to –16 bars |

### *What about PRD?*

Partial rootzone drying (PRD) is a practice that was originally devised in Australia based on work that was done with potted plants. Initial studies indicated that by allowing one portion of the root system to dry down while the other side was well-watered, the plants would be induced to partially close their stomatal pores and, in so doing, conserve water while maintaining an otherwise high water status. In order to maintain that state, the split root systems would need to have alternating drying and wetting cycles.

Early trials conducted in Australia suggested that, by using PRD in a vine-

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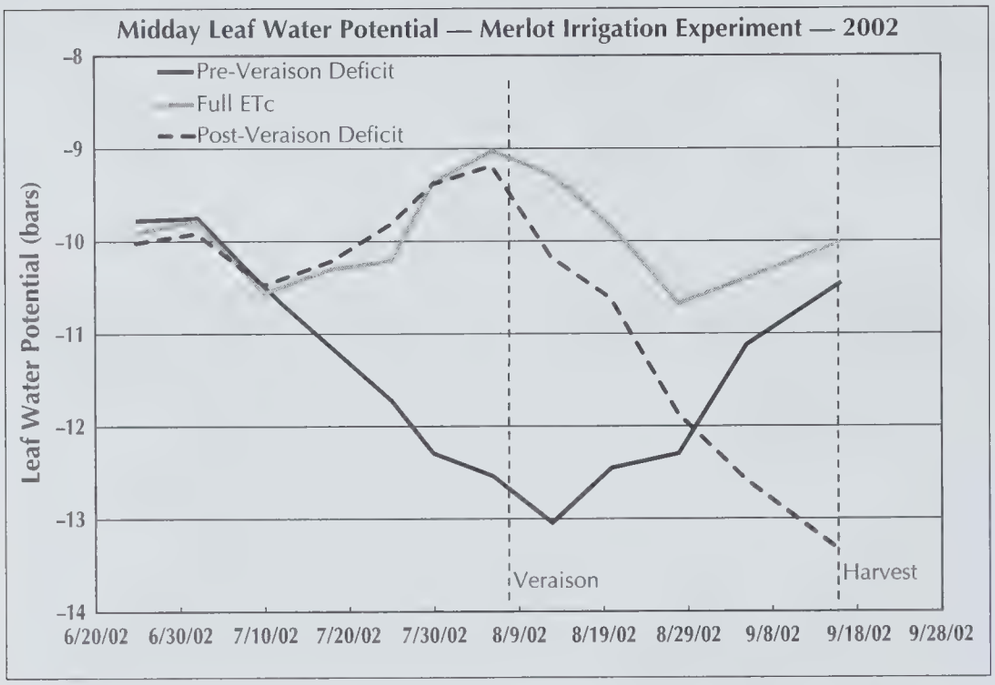


**Figure I: Examples of midday leaf water potential during the season for three deficit irrigation strategies.**

yard, water could be conserved while maintaining yield.[6] This intriguing idea was tested in Gallo of Sonoma vineyards. In several Gallo trials, PRD combined with deficit irrigation was tested to see if there was a PRD-effect separate from the deficit irrigation effect. No vine responses to PRD were observed that were not attributed to deficit irrigation.

Recent studies, including one from Australia, have shown that Gallo's negative PRD experiences were probably more typical than the earlier studies had indicated.[7] Current research in Australia suggests that PRD will be effective only under certain soil and climatic condition, but there is a general feeling that deficit irrigation (RDI) is a more reliable method to achieve both viticultural and water savings goals.[8]

### *Post-harvest irrigation strategy*

Although this discussion has focused on irrigation strategy during fruit development, post-harvest irrigation is also important and should not be neglected. After harvest, the grapevine has an opportunity to rejuvenate itself, being free of the fruit load it has been carrying all season. Free of the fruit sink, sugars from photosynthesis are directed into the root system, with some retained in the trunk and canes. After conversion to starch, they are stored in this part of the vine to be used for food at budbreak the next spring.

Therefore, it is important to provide the vine with ample water (and possibly a little bit of fertilizer) to maintain healthy leaves until the leaves drop. As the vines tend to drop leaves shortly following fruit removal, there should be no delay in getting the vines into a high water status following harvest.

Continue to use the $ET_c$ model discussed in section A. After harvest, crop coefficient models should decline to reflect the loss of transpiration due to leaf age, abscission and removal of fruit. Additionally, $ET_o$ values will be smaller due to shortening of days. Irrigate at a high level, but not at 100% of $ET_c$ to avoid regrowth of shoots, which will sap the vine of carbohydrates rather than

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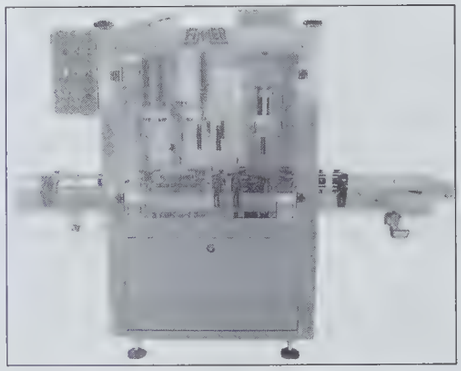

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channeling it into the permanent vine structure. An 80% of $ET_c$ level should suffice and irrigation may be discontinued after the first good rainfall and/or the end of October in most regions.

It is not good to apply a big shot of nitrogen fertilizer along with post-harvest irrigation or it might stimulate shoot growth. However, if the harvest is early and there are several weeks before anticipated leaf fall, it might be worthwhile to apply 5% to 10% of the annual nitrogen fertilizer immediately after harvest. The strategy is relatively simple at this time of year, but irrigation is often neglected after harvest. It shouldn't be.

### Water supply

All of the above discussion assumes that the vineyard has ample water supply for any management strategy, which is clearly not the case for many vineyards. As irrigated vineyards may require from two inches of irrigation in cool coastal valley floors to over 12 inches in arid Central Valley regions, water availability throughout the growing season might be an overriding consideration.

Where there is no irrigation district (as in most California coastal growing regions), water must be pumped from wells or stored on-site in reservoirs. While water storage system design is beyond the scope of this discussion, a limitation on water availability dictates that a grower must tailor his or her strategy such that sufficient water is available during the critical ripening process.

### Remember what is important

No matter what irrigation strategy is employed, it is imperative that we realize that the vine is in the center of it all. While soil type and depth, rootstock, spacing, row orientation, trellis type, variety, and climate are all components of the big picture, we can easily get confused by all of these variables when trying to make irrigation decisions.

We can make the job easier and more effective by using vine monitoring techniques (see section B) to understand how the vines react to irrigation practices and make any adjustments accordingly. By focusing most of our attention on the vines, we eliminate much of the site-specific aspects of irrigation management, allowing us to steer our water management into the direction of the desired wine-style target. ■

*The author wishes to thank the Gallo family for their tremendous support and the staff of Gallo of Sonoma Winery & Vineyards for their substantial contributions and Nick Dokoozlion for his support. Special thanks to Jim O'Donnell for his invaluable efforts on the research projects. Additionally, the content reviews from Stan Grant, Jeff Lyon, Steve Matthiasson, and Kirk Grace are sincerely appreciated.*

**References**

1. May, P., *Flowering and Fruitset in Grapevines.* 2004. Lythrum Press, Adelaide, Australia.

2. C. Zapata *et al.* 2004. "Partitioning and mobilization of starch and N reserves in grapevine (*Vitis vinifera* L.)." *Jour. of Plant Physiology.* 161:1031–1040.

3. Matthews, M.A., and M.M. Anderson. 1988. "Fruit ripening in Vitis vinifera L.: Responses to seasonal water deficits." *American Jour. of Enology & Viticulture.* 39:313–319.

4. M.D. Greenspan, *et. al.* 1996. "Field evaluation of water transport in grape berries during water deficits." *Physiologia Plantarum.* 97:55–62.

5. Rogy, G. *et al.* 2004. "Berry size and vine water deficits as factors in winegrape composition: Anthocyanins and tannins." *Australian Jour. of Grape & Wine Research.* 10(2):100–107.

6. Dry, P.R., B.R. Loveys. 1998. "Factors influencing grapevine vigour and the potential for control with partial rootzone drying." *Australian Jour. of Grape & Wine Research.* 4(3):140–148.

7. M. Collins *et al.* 2004. "PRD: A response to irrigation type or water level? A case-study in north-eastern Victoria." *Australian Grapegrower & Winemaker.* 490:58–62.

8. Peter Dry, Brian Loveys, Michael McCarthy and Mark Krstic, personal communication.

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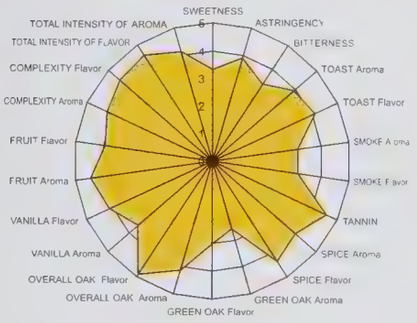


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Innerstave's highest acclaim is for its award-winning flavors found in wines of all price ranges, including ultra-premiums.

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Innerstave's "OakPLUS" oak chips have been a flavor benchmark for oak chips used in wineries. The low-dose, high-flavor impact of these chips makes them one of the most requested chips in the industry.

For winery-friends who have small lots of wine or are far away from Innerstave's home in Sonoma, CA, Innerstave offers Chain O' Oak, a self-install alternative to new barrel Innerstave.

Innerstave guarantees satisfaction in everything it does!

*For more information, contact:*
**Innerstave, LLC**
24200 Arnold Dr., Sonoma, CA 95476
tel: 707/996-8781; fax: 707/996-1157
e-mail: sales@innerstave.com
website: www.innerstave.com

*PLEASE SEE INNERSTAVE AD, PAGE 49.*

## Scott Laboratories, Inc.

This year, Scott Laboratories highlights two new products. Both stem from independent research to optimize the benefit wines can receive from yeast-product contact-time.

Recent research by Laffort Oenologie has shown a specific, naturally-occurring peptide fraction is responsible for the perceived sweetness and enhanced mouthfeel of lees-aged wines. Once the peptide fraction was identified, Laffort took on the task of extraction and isolation from wine yeast cultures. The result of Laffort's work is Biolees. This yeast-based nutrient product will contribute the positive sensory impact of sur lie aging and stirring while drastically reducing time and labor expense. Contact with Biolees for 3–5 weeks contributes similar flavor and mouthfeel components as does six months of lees aging and stirring. Biolees also helps eliminate harsh phenolics, improve balance, and protect wine from oxidation, similar to sur lie aging.

Lallemand's Booster Rouge is inactivated yeast selected from Saccharomyces cerevisiae chosen by the ICV for rapid availability of soluble yeast cell wall fractions that help add colloidal balance and structure to wine. The use of Booster Rouge in juice helps reduce the production of sulfur off-flavors and optimize the length of malolactic fermentation. In red wines, Booster Rouge helps give a greater perception of volume in the initial mouthfeel due to perceived tannin intensity. Interactions between aromatic precursors and yeast macromolecules are improved to give the impression of greater fruit and freshness. Conversely, chemical, burning sensations, and the perception of "sawdust" or green wood are reduced.

*For more information, please contact:*
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e-mail: info@scottlab.com
website: www.scottlab.com

*PLEASE SEE SCOTT LABORATORIES, INC. ADS, PAGES 62, 86.*

## Star Filters

Star Filters has provided filtration solutions for more than 100 years. Recently, Star has focused their expertise towards the wine industry to offer four styles of filters, and filter media.

**Star compact polishing filter** B Standard features: portable, four-wheel, locking-caster design; six 47-cm precision-machined and internally ported plates for optimum sealing; large usable filtration area: 40% more per plate than a 40-cm design.

**Star DE filter** B Standard features: ten 12-inch thick DE plates, full 1.7 $ft^3$ of sludge capacity; 202 $ft^2$ of filtration area.

**Star combination filter** B Standard features: integral crossover plate facilitates two-stage filtration; ten 12-inch thick DE plates; ten polishing plates; mix and match plates for specific product needs.

**Portable membrane filter** (*The alternative to DE filtration.*) B Standard features: single-pass filtration; steam sterilizable; retention ratings of 0.2 Fm and 0.5 Fm; stationary, high process-rate models available.

**Star depth-style filter media pads** B Standard features: high flow rate and capacity; high wet tensile strength; low extractable levels, low media migration; non-toxic; available in eight micron retention ratings (0.2 Fm — 0.5 Fm).

All Star presses are available in custom sizes and manufactured with 304 stainless steel construction and polypropylene plates, to solve the difficult task of filtration. Star Filters, a division of The Hilliard Corporation, is headquartered in the beautiful Finger Lakes region of New York.

*For more information, contact:*
**Star Filters**
100 W Fourth St., Elmira, NY 14902
tel: 607/733-7121; fax: 607/737-1108
e-mail: hilliard@hilliardcorp.com
website: www.hilliardcorp.com

*PLEASE SEE STAR FILTERS AD, PAGE 20.*

## Nadalié, USA

FIRE! FIRE! FIRE! is the motto for Nadalié barrels and Oak Add Ins. Although the products differ, the concept of toasting and wood sourcing remains the same.

NADALIE
USA

Barrels supplied by Nadalié continue to have traditional open-fire toasting. In America, Nadalié started the fire-toasting process in 1980. Barrels manufactured in Calistoga, and Bordeaux are toasted the old, traditional French way. To focus on the fruity and spicy character of French oak, the Bordeaux cooperage has developed the **Perle Blanche** toasting process of barrels primarily for white wines.

All the Oak Add Ins are also toasted over open-oak fires. Thereby, wines processed with Oak Add Ins are unique in the industry. Over the past year, manufacturing of Oak Add Ins has been refined to focus on two major toasts - medium, and medium-plus. More toasting levels are also available for chips, cubes, and blocks. Nadalié manufactures a complete line of Oak Add Ins which respects traditional winemaking techniques.

Nadalié is celebrating its 25th Anniversary, May 20 in Calistoga, with a "Barrel Issues in 2005" dinner and entertainment.

*For more information, contact:*
**Nadalié, USA**
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tel: 707/942-9301; fax 707/942-5037
e-mail: nadalie@napanet.net

*PLEASE SEE NADALIÉ USA AD, PAGE 85.*

## Glass Pak

*domnick hunter*, a multi-national organization, has teamed up with *Glass Pak* of Fairfield, CA, to offer total beverage solutions in filtration to wineries and bottlers in California, Oregon, and Washington. *Glass Pak* supplies *domnick hunter* products, including pads, cartridge prefilters, sterile membranes, equipment, parts, and technical support.

*Glass Pak's* on-site technical support is further sponsored by *domnick hunter's* technical support lab in Charlotte, NC, which is available to all customers for quick filter analysis as part of their ongoing customer service philosophy. It is further strengthened by *Glass Pak's* commitment to on-hand inventory, same day shipment, and strong field support.

GLASS PAK

All *domnick hunter* membranes are 100% integrity-tested and fully validated prior to shipment, and are made with PES (polyethersulfone), a membrane material with a molecular structure to provide better flow rates at lower differential pressures.

The full *domnick hunter* product line provides total beverage solutions to bottlers, offering filtration applications from sterile compressed air, nitrogen generation systems, $CO_2$ purification systems, to pad and sterile bottling filtration.

*For more information, contact:*
**Glass Pak**
**Dallas Nelson**
5000 Fulton Dr., Fairfield, CA 94534
tel: 707/207-0400; fax: 707/207-0900
e-mail: dallas@glasspak.com

*PLEASE SEE GLASS PAK AD, PAGE 59.*

## International Specialty Products

ISP's Polyclar® wine stabilizers are based on proven Polyvinylpolypyrrolidone (PVPP) technology. This provides effective and highly selective reduction of polyphenols causing oxidative discoloration, haze, or loss of fresh aroma and flavor characteristics.

ISP
INTERNATIONAL SPECIALTY PRODUCTS

More specifically:
- Prevention of "pinking" and "browning" reactions in white and sparkling wines,
- Improved wine clarity in bottle,
- Enhanced aroma and flavor in red wines — preserving more of the highly-desirable fresh, fruity character,
- Reduction in excessive astringency or color when needed.

**Polyclar® V** is a preferred option for use in wine due to it's large surface area, which permits maximum efficacy. It is usually added to wine after initial clarification, during or after tartaric stabilization, or before pre-bottling filtration.

**Polyclar® VT** is a coarser grade of PVPP, optimized for addition to wine in tanks. The large particle size facilitates settling of the stabilizer, allowing the majority of the product to be left behind with the lees at racking.

*For more information on ISP Polyclar® stabilizers for wine, contact:*
**International Specialty Products**
**Mustafa Rehmanji**
1361 Alps Rd., Wayne, NJ 07470
tel: 973/872-4403; fax: 973/628-3886
e-mail: info@ispcorp.com
website: www.ispcorp.com

*PLEASE SEE INTERNATIONAL SPECIALTY PRODUCTS AD, PAGE 87.*

## Maurivin Yeast & Rohavin Enzymes

The manufacturers of Maurivin yeast, AB Mauri, announce new ownership by the global food and ingredients company Associated British Foods (ABF). This strategic alliance sees AB Mauri now working alongside renowned enzyme manufacturer AB Enzymes, which produce the popular Rohavin range of wine enzymes.

maurivin™

Dr. Nicholas Yap, Maurivin technical sales manager, says, "This is a win-win situation for both companies. A company that manufactures and distributes both wine yeast and enzymes has great synergies, both in terms of product development and commercially."

Maurivin offers 14 wine yeast strains, including the ever-reliable PDM, and strains producing lower amounts of ethanol like AWRI 796, and Maurivin B which consumes high quantities of malic acid during alcoholic fermentation. The Maurivin range also includes strains ideal for aromatic white winemaking, such as Elegance and Sauvignon L3, which enhance the concentration of aromatic volatiles during fermentation.

AB Enzymes
an ABF Ingredients company

AB Enzymes provide a range of enzymes for winemaking, including the highly specific ROHAVIN® MX for improving preliminary juice extraction. AB Enzymes also has enzyme combinations available, one of which is the enzyme cocktail ROHAVIN® VR-X, which increases the color, taste, and filterability of wine.

Both Maurivin yeast strains and ROHAVIN® enzymes are available from Pacific Coast Chemicals.

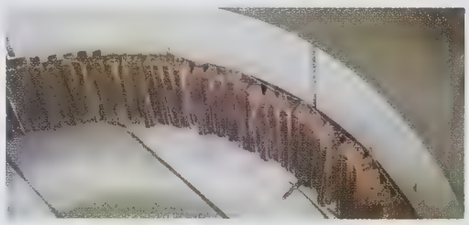
*For more information, contact:*
**Pacific Coast Chemicals**
2424 Fourth St., Berkeley, CA 94710
tel: 510/549-3535; fax: 510/549-0890
e-mail: steveshaffer@pcchem.com
website: www.pcchem.com

*PLEASE SEE MAURIVIN YEAST AD, PAGE 52.*

## StaVin Incorporated

StaVin's Oak Integration Systems provide *traditional flavor and real economics*. French, Hungarian, and American oak is naturally seasoned for three years and is available in three toast levels. To ensure thorough heat penetration and complex flavors, all oak is traditionally fire-toasted.

On the website, www.micro-ox.com, StaVin discusses how oak and a micro-oxygenation system replicates benefits of winemaking in barrels — within tanks. Also, read how StaVin's fire-toasted oak effectively cross-link grape tannins to build mid-palate structure and stabilize color during red wine fermentation.



Reduce your dependency on barrels for flavor and aging. StaVin's 44 sq. ft. Oak Stave Packs deliver the same traditional flavors as your favorite barrels via three tank configurations: the Tank Modular System, Tank Matrix, and the new Tank Stave Fan system.

StaVin's French, Hungarian, and American Oak Beans, and French Oak Stave Segments are versatile and cost-effective systems, packaged in food-grade nylon bags, for imparting oak flavor within tanks.

Impart neutral barrels with the complexity and quality of new oak barrels. Use StaVin's Oak Barrel Replica, Traditional Barrel Insert (now available in a new barrel extraction level), and Infusion Tube.

StaVin offers Tonnellerie Saint Jacques 3-year seasoned, French oak barrels.

*For more information, contact:*
**StaVin Incorporated**
**Alan Sullivan, Steve Sullivan**
**Dr. Jeff McCord, Dr. Jeff Murrell,**
**Jennifer Metz, Jamie Zank**
PO Box 1693, Sausalito, CA 94966
tel: 415/331-7849; fax: 415/331-0516
e-mail: info@stavin.com
website: www.stavin.com

*PLEASE SEE STAVIN INC. AD, PAGE 37.*

## Gusmer Enterprises

Chr. Hansen's new yeast blend combines *Saccharomyces* and selected non-*Saccharomyces* strains to mimic the desirable results of a "wild" fermentation under controlled conditions with an inoculated source. The product and concept, introduced in 2004, has become a big success.

Wild fermentations are potentially great for adding complexity but can be a gamble because you can get undesirable characteristics and stuck fermentations. This concept gives winemakers the improved complexity found in successful "wild" fermentation and the control and reliability of conventionally inoculated fermentations.

Two yeast blends are available in 500-gram packets: Symphony.nsac, a blend of *Saccharomyces cerevisiae* and *Kluyveromyces thermotolerans*, and Harmony.nsac, a blend of *Saccharomyces cerevisiae, Torulaspora delbruckii*, and *Kluyveromyc thermotolerans*.

For fast and effective malolactic fermentation, use Viniflora oenos, Viniflora CH-35, or Viniflora CH-16. These freeze-dried cultures are poured directly from the package into the wine. Gusmer Enterprises offers a full range of Chr. Hansen Viniflora bacteria and lysozyme.

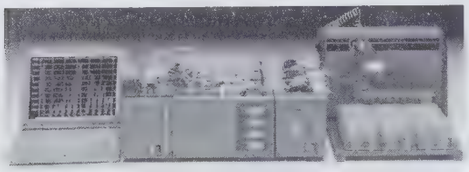
Gusmer Enterprises also offers filter media, fining agents, yeast, bacteria enzymes, oak alternatives, and more.

*For more information, contact:*
**Gusmer Enterprises**
West Coast:
640-D Airpark Rd., Napa, CA 94558
tel: 707/224-7903; fax: 707/255-2019
81 M St., Fresno, CA 93721
tel: 559/485-2692; fax 559/485-4254
East Coast:
1165 Globe Ave., Mountainside, NJ 07092
tel: 908/301-1811; fax: 908/301-1812
e-mail: sales@gusmerenterprises.com
website: www.gusmerenterprises.com

*PLEASE SEE GUSMER ENTERPRISES AD, PAGE 65.*

## Astoria-Pacific International

The Wine Analyzer by Astoria-Pacific International is a reliable, versatile, and rapid analysis system that can test a variety of wine constituents simultaneously. For instance, total $SO_2$, free $SO_2$, and volatile acidity levels are routinely monitored in the wine industry. The Wine Analyzer can provide reliable, repeatable, and extremely accurate reports of product quality in wine production.



With the introduction of its new six-channel, multi-analysis detector; new powerful data-acquisition software; versatile, high-capacity samplers; and outstanding customer service, Astoria-Pacific has perfected these analyses and has positioned itself as a global leader in automated wet chemistry.

Any winery seeking to automate its current wet chemistries, replace its current automated system, and/or compete in the global economy, should consider the Astoria7 Analyzer for its wine analyses.

Contact Astoria-Pacific International, a leader in automated wet chemistry, to learn how the Astoria7 Analyzer will help produce the best possible wine.

*For more information, contact:*
**Astoria-Pacific International**
**Brady Miller**
PO Box 830, Clackamas, OR 97015-0830
tel: 800/536-3111 (toll free U.S./Canada)
tel: 503/657-3010; fax: 503/655-7367
e-mail: brady@astoria-pacific.com
website: www.astoria-pacific.com

## XTRAOAK

XTRAOAK is the oak adjunct division of Canton Wood Products (producer of Canton American oak barrels). For more than 30 years, XTRAOAK has been producing the highest quality American and French oak adjuncts for the domestic and international wine industry.

XTRAOAK products include French and American oak chips, granular oak (for use during fermentation), stave inserts for barrels and tanks, and two XTRAOAK exclusives: XOAKERS (1-inch solid oak spheres for use in barrels and small storage containers), and the innovative OAK-ON-A-ROPE oak chain for oak renewal of neutral barrels. All XTRAOAK oak is naturally seasoned and carefully toasted, employing time-tested techniques of the cooper's craft.

XTRAOAK
CANTON WOOD PRODUCTS

XTRAOAK products offer winemakers convenient oak options that can add interest and character to wines at a reasonable cost. In addition, XTRAOAK OAK experts are available to answer your oak-adjunct questions and to provide the best technical support.

*For more information, please contact:*
**XTRAOAK**
5793 Skylane Blvd #B
Windsor, CA 95492
tel: 707/836-9742; fax: 707/836-9759
e-mail:canton@cantonwood.com;
website: cantoncooperage.com

*PLEASE SEE CANTON COOPERAGE AD, PAGE 32.*

## BPM Minerals

A world leader in production of Wyoming bentonite, a benchmark in the global sodium bentonite industry, BPM's Mission Statement is: to develop, market, manufacture, and support the finest bentonite products in the world. BPM products are leaders in a range of industrial, specialty, consumer, and environmental markets worldwide. BPM was the first Wyoming bentonite producer to achieve ISO registration at all manufacturing locations. BPM is also licensed to use the API monogram labeling on its API bentonite products.

BPM Minerals LLC

Fining Agent:

VITIBEN® fining agent is made of the purest bentonite and produces superior clarity and heat stability that fine wines deserve. VITIBEN is designed to "fine" or remove undesirable compounds from wine and juices. These compounds include phenolics, proteins, and tannins, which are present in the fruit or result from natural enzyme reaction during processing and aging.

Benefits:

- Superior dispersibility,
- Easier handling,
- Higher yields,
- Higher activity,
- Longer equipment life.

**VITIBEN** fining agent is listed by the Food & Drug Administration (FDA) as Generally Recognized As Safe (GRAS). **VITIBEN** is certified as Kosher by the Scroll K.

Purchase **VITIBEN** directly from one of BPM Minerals LLC agents: Brenntag Pacific, Inc., 559/268-4571, or Gusmer Enterprises, 559/485-2692

*For more information, please contact:*
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e-mail: don.schulthess@halliburton.com
website: www.bentonite.com

*PLEASE SEE BPM MINERALS AD, PAGE 8.*

## Pall Corporation

Pall's SUPRAdisc™ II Filter enhances wine purity and flavor.

Even a wine connoisseur may not be aware that their favorite beverage likely owes its character, in part, to effective filtration. Freeing wine of yeast and other impurities can give wine a more robust flavor, greater clarity, and longer shelf life. Pall offers the versatile SUPRAdisc™ II depth filter, which encloses Seitz sheet filter media in a rigid polypropylene module. The modules can be used for fermentation clarification or installed behind a DE filter at the polish filtration stage to extend the life of the final filters.

**Pall's SUPRAdisc II filter for winemaking**

The SUPRAdisc II filter is designed to be durable and produce wine of consistent quality. Its inner core is structured to retain integrity after many uses and steam sterilizations. The filter tolerates temperature changes so that module stacks don't have to be opened and re-tightened. Keeping the stacks sealed reduces the possibility for contamination. The filters last longer because they can handle reverse flow and are back-flushable during cleaning. Wine can flow in either direction, reducing wine loss. The SUPRAdisc filter offers these advantages at a competitive price.

*To learn more, please contact your local Pall distributor toll-free at 888/873-7255.*

**Pall Corp. North America**
**Nicole Madrid**, General Sales Manager
2200 Northern Blvd., East Hills, NY 11548
tel: 516/801-9482

## BASF Corporation

BASF doesn't make wine. BASF helps make wine better with high-quality Divergan® PVPP products. Divergan F and Divergan HM are used by wineries — typically for white wines and especially blush wines — to keep the color of a wine stable and prevent it from turning "rusty." Divergan products also help maintain the smoothness of the flavor.

**Divergan® F** provides the following benefits:
- Clarifies,
- Stabilizes,
- Prevents chill haze,
- Enhances flavor stability.

**Divergan® HM Polymer*** provides the following benefits:
- Removes trace heavy metals,
- Lowers turbidity,
- Reduces bitterness,
- Helps increase shelf life.

** Requires users to follow TTB Title 27 Application for use of new treating material.*

In addition to Divergan products, BASF adds value with the reliability, responsiveness, and service of a company focused on customers' needs. BASF adds value with technical support and expertise.

BASF

The Chemical Company

BASF — The chemical company that does not make a lot of the products you buy. BASF make a lot of the products you buy better®.

*For more information about Divergan products, please contact:*

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website: www.HelpingMakeWineBetter.com

*PLEASE SEE BASF AD, PAGE 25.*

## KLR Machines Inc.

KLR has represented Begerow of Germany since 1984 and DSM Food Specialties since 2003.

Begerow is recognized industry-wide for very high-quality filter sheets and other filter media. Through a wide range of pore sizes, winemakers can filter through all ranges of clarity.

Begerow sheets have the least amount of ion migration coupled with the highest retention of particulate matter of any filter sheet in the industry. Sheet grades for wine range from K-1 at nominal 4.5 micron retention to Steril 40 through Steril 100 sheets at nominal 0.1 micron retention.

DSM experience traces back to 1902 when the company was first founded in the Netherlands. In 100 years, DSM has grown into a world-wide specialty chemical and life science company. With a strong knowledge in fermentation and enzyme technology, DSM Food Specialties develops, produces, and supplies effective ingredient-based solutions for all wine applications.

DSM yeast include the Fermivin line for healthy fermentation, the Fermicru line for enhanced harvest potential and the Collection Cepage™ line for fermenting specific varieties. Enzymes include the Rapidase line for all ranges of activity-balancing. For fermentation management there is Maxaferm for stuck fermentation and high sugar must.

*For more information, contact:*

**KLR Machines, Inc.**
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## CONSUMER PRODUCT MOVEMENT

# Quality and convenience drive wine packaging innovations

**BY Joel Quigley,**
**Paige Poulos Communications,**
**Director, Alliance for Innovative Wine Packaging**

Social and technological changes have brought the wine industry to an intersection of tradition and opportunity. The upside of opportunity is as profound as it is simple: a new innovative-minded industry provides premium-quality wines in an array of convenient packaging, expands the market for wine, and reaps the rewards.

Many industry leaders understand that consumer demand for convenience is dominating virtually every aspect of consumer-oriented goods and services. Everything is becoming easier, faster, better. In the past, "easy" meant "cheap." Today, convenience and quality go hand-in-hand.

As an example, in the age of fast food and drive-thru windows, grab-and-go prepared foods have firmly established a place on supermarket shelves across the U.S.

According to the 2004 National Meat Case Study conducted by Shugoll Research for the American Meat Institute, between 2002 and 2004, convenience items were the fastest growing food categories. Shelf space allotted to heat-and-serve items in grocery stores grew by 64%. Ready-to-cook items grew by 33%.

"Many of these heat-and-serve and ready-to-cook entrée items are made from the highest quality ingredients — just picture the aisles of Whole Foods Markets," said Paige M. Poulos, president of Paige Poulos Communications and founder of the Alliance for Innovative Wine Packaging, in a speech to 900 retailers at the 12th Annual Meat Conference in Orlando, FL. Today's shopper has the choice of grabbing premade hamburgers or a pre-cooked cut of beef or lamb. Heat-and-serve is shaving precious time off meal preparation in households across the U.S.

"Easy-to-open-and-close screw cap bottles are also getting attention. Convenience and value when shopping for everyday meals are of paramount importance to women, who have the lion's share of responsibility for putting dinner on the table every night. The wine industry needs to understand that we *can* have it both ways. Tradition is not going away, but we need to meet the consumer's demand for quality and convenience. Innovative packaging is the answer."

The conventional wine box is better than ever and now comes in many sizes filled with superb quality, vintage-dated varietal wine. There is a new wave of shapes with artistic yet functional designs headed for market. This form of packaging represents a significant gain in the volume that can be shipped in a container compared to the standard 9L case of wine bottles.

G-3 Enterprises has proven its commitment to innovative wine packaging by bringing the manufacturing of its sophisticated new "Royal 90" long flange screw cap to the U.S. Rivaling the elegance of traditional capsule finishes, this closure requires no tools to open.

"Beyond the aesthetic appeal and quality of our Royal 90 screw cap as a closure," explains Kyle Rossler, vice president of sales and marketing at G-3 Enterprises, "our screw caps can be engineered to mimic cork in allowing oxygen to contact the wine in the bottle. Producers can choose among a range of oxygen transfer rates to appropriately match the wines they are bottling, whether red or white."

"We took a calculated risk based on strong industry research, when we redesigned our Cypress package to feature the screw cap as the optimal means to preserving the bright fruit flavors in these wines," says Cynthia Lohr, director of communications at J. Lohr Vineyards & Wines, producers of Cypress Wines. "We also knew that consumers wouldn't embrace the change to screw cap immediately. It's a synergistic process. This is why we joined the Alliance — to pool our resources and evangelize with other forward-thinking producers to accelerate consumer acceptance and build the category."

A growing number of wineries and suppliers think that future growth will be based on the industry's ability to give consumers high-quality wines in convenient containers. Many of them have joined forces to form The Alliance for Innovative Wine Packaging, an association of wineries, wine package suppliers and designers.

Charter members of The Alliance include The Wine Group, Delicato Vineyards, Cypress Wines, and Brutocao Vineyards & Cellars among the wineries. Suppliers include G-3 Enterprises, International Paper, Field Manufacturing, and Tincknell & Tincknell. Paige Poulos Communications runs the day-to-day operations.

The Alliance makes presentations at industry conferences, has a communications program, conducts trade and consumer tastings and quarterly meetings. A wine packaging competition is slated for fall 2006.

Visit the Alliance online at www.NextInWine.com, and then click "Join Us" to register for free updates on news, product launches, and events featuring wines in innovative packaging. ■

# PWV BOOKSHELF

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**115pp—$110.00**

**Cooperage for Winemakers**
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Dept. of Primary Industries & Resources, South Australia **106pp—$40.00**

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Magarey, MacGregor, Wachtel, & Kelly
Sturdy, laminated, pocket-sized guide containing more than 350 color photos with short, easily-read descriptions of most diseases, pests, and disorders found in vineyards.
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Peter May
How weather affects fruitset. Published by Phylloxera and Grape Industry Board of South Australia. **120pp—$28.50**

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Original book (reprinted with corrections) that explains how to make most of refrigeration in the winery with a troubleshooting guide.
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A Zinfandel ODYSSEY
100 interviews with Zinfandel growers and producers throughout California and Mexico.
450 pages including photos
Edited and published by ***PWV***
**$39.00**

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50 case studies in wine public relations promoting wine, wine companies, and wine-related issues. **220pp—$39.95**

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R. Smart & M. Robinson
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# International Cool Climate Symposium for Viticulture and Enology

**BY Glen Creasy, Chair,
ICCS 2006 Program Subcommittee
and Senior Lecturer
Centre for Viticulture & Oenology
Lincoln University, Christchurch,
New Zealand**

New Zealand will, once again, host the International Cool Climate Symposium for Viticulture and Oenology (ICCS), which is usually held every four years. The February, 2006 event will be held in the heart of the South Island, Christchurch. It will look to attract all those in the wine industry with an interest in growing, making, and selling wines from cool climate areas. A previous symposium was held in Auckland in 1988.

Since that time, the South Island has become the largest producer of wine in New Zealand, surpassing the North Island after expansion in Nelson, Canterbury, Central Otago, and most significantly, Marlborough. The increase in production has been driven by rapidly growing export markets, with high-quality Sauvignon Blanc. The cool climate Marlborough style has been a winner with consumers, but rather than resting on its laurels, the industry is increasing production of more cool climate styles of varieties such as Pinot Noir, Pinot Gris, and Riesling.

The international wine scene has changed considerably since the first ICCS in Corvallis, Oregon, in1984. Previous symposia there and in Auckland; Mainz, Germany; Rochester, New York; and Melbourne, Australia have helped identify and promote many issues germane to cool climate winegrowing, such as the benefits of canopy management, and in helping to define where the cool climate areas are in the world.

"Winegrowing for the Future" is the theme of the 2006 ICCS. The organizing committee (made up largely of members of the New Zealand Society for Viticulture & Oenology) has been working to ensure the event lives up to its theme. A wide array of speakers well-informed on topics related to cool climate winegrowing has been confirmed.

Topics will include: challenges of increasing production efficiencies, dealing with in-season frost events, managing flavors in the vineyard and winery, and running the business in a sustainable manner. A close integration between the science and practice will be in evidence, with emphasis on the goal of getting new ideas and technologies into commercial use and benefiting the industry.

Another question organizers will seek to have addressed is: what makes a cool-climate wine from the standpoints of the producer, marketer, and consumer? Although there is general industry agreement on what constitutes a cool-climate production area, do consumers see a distinction at all? Does the idea of a cool climate wine mean anything to them?

To learn more about this international event, visit the ICCS 2006 website at www.iccs2006.org.nz. for more information and registration details. ■

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INTERNATIONAL COOL CLIMATE SYMPOSIUM 2006

# 125th Anniversary Celebration: UC Davis Viticulture & Enology program

**JUNE 28, 2005**

Alumni and wine enthusiasts are invited to attend a day-long event at Freeborn Hall, UC Davis. Lunch will feature wines from recent UC Davis graduates and scholarship recipients. COST: $125 for seminars, $100 for Gala Dinner, $200 for program and dinner. For more information or to register, call 800/752-0881, email: aginfo@unexmail.ucdavis.edu or visit: www.extension.ucdavis.edu/winemaking.

**9 AM TO 5 PM**

**Welcome by** James Wolpert, department chair

**Looking Back: Journey through Enological Time** — James Lapsley, assoc. adjunct professor, Ralph Kunkee, professor emeritus.

**Quest for Quality: Architects of Innovation in Winery / Vineyard** — Roger Boulton, David Block, Andrew Walker, David Smart, professors.

**Taste of History** — Andrew Waterhouse, professor, Darrell Corti, proprietor, Corti Brothers.

**Lunch**

**Defining California's Style** — Moderator: Linda Bisson, professor; Panelists: Dan Berger, David Berkley, Jim Hightower, Karen MacNeil, Frank Prial, Rod Smith.

**A Taste of Today: Crafting Wines for the 21st Century** — Moderator: Doug Adams, professor; Panelists: Merry Edwards, Michael Martini, Dave Ramey, Jane Robichaud.

**Beyond Preferences: Separating Fact from Fiction in Food and Wine Pairing** — Hildegarde Heymann, professor, Karen MacNeil, chair, Wine Dept., Culinary Institute of America.

**5:30 PM GRAND WINE TASTING**

**7:00 PM GALA DINNER**

## 2005 ASEV/ES Symposium

# Spotlight on cutting-edge cultivars

**BY Anna Katharine Mansfield, University of Minnesota Enologist**

The American Society for Enology & Viticulture, Eastern Section, will conduct its annual technical meeting and a "Cutting-Edge Cultivars Symposium" at the Millennium Hotel St. Louis, St. Louis, MO, July 13–16, 2005. In response to increased interest in terroir-specific cultivar selections, the program will explore viticultural and enological aspects of specific grape cultivars significant to eastern winegrowing. Half-day sessions will focus on Traminette, Pinot Gris, and Norton, along with a variety of new cold-climate hybrids from the upper midwest. Additional information is available at www.nysaes.cornell.edu/fst/asev/.

Traminette, released by Cornell University in 1996, has become one of the most widely planted white cultivars in the east and midwest. Vigorous, productive, and relatively cold-hardy, it produces a floral, spicy wine reminiscent of its parent, Gewurztraminer.

Winemaker John Brahm, who produces three styles of wine from Traminette at Arbor Hill Winery (Naples, NY), will share what he's learned from working with the cultivar in both winery and vineyard for over 15 years. University researchers from Virginia Tech and Purdue University will discuss results of training system and wine production trials conducted for the last five years. A selection of Traminette wines from across the region will be featured at the annual awards banquet on Friday, July 15.

Pinot Gris, well known for quality wine production in Italy and Oregon, has shown significant promise as a white cultivar in cooler areas of the eastern U.S. Its high performance, coupled with increasing consumer demand for whites other than Chardonnay, has made Pinot Gris a popular choice for growers in Ohio and Michigan.

Todd Steiner and Imed Dami, both of Ohio State University, will highlight the effects of training systems and pressing methods specific to Pinot Gris production in the eastern U.S. A panel of commercial producers will serve wines from throughout the region, and will discuss methods of producing quality wine from this cultivar.

Norton, a native cultivar unique in its potential for high wine quality, has long been claimed as the state grape of both Virginia and Missouri. Known for its robust, fruity, lush red wine, Norton is also becoming a prime candidate for low-pesticide grape production because of its high disease resistance and outstanding winter hardiness. Many speakers from both Missouri, where Norton is the largest-planted red, and Virginia will lead a wine tasting and panel discussion. A tour of Hermann, MO area wineries, on Wednesday, July 13, will allow further discussion of Norton production.

Recent expansion of wine production in the upper midwest, New England, and Quebec has been due partly to introduction of several cold-hardy cultivars bred at the University of Minnesota. Frontenac, one such red, and whites La Crescent and Frontenac Gris will be featured in the final cultivar section. Grape breeder Peter Hemstad and other researchers from the university grape breeding and enology projects will discuss vineyard performance, aroma profiles, and unusual chemistries of these varieties. There will be a tasting of various production styles, with selections from cold climate grape pioneer Elmer Swenson also featured.

The cutting-edge cultivars program will also include technical presentations, including the viticultural consortium: eastern research summit; an industry trade show, wine reception; student paper competition; and annual business meeting and banquet. The program will be held in conjunction with the International Grape Genomics Symposium, July 12–14; for more information visit: http://mtngrv.smsu.edu/symposium.■

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# Seguin Moreau improves facility; earns eco-certification

Seguin Moreau Napa Cooperage, Inc. has upgraded its U.S. production facility. Building improvements have streamlined barrel production and provided coopers with more flexibility to prepare winery orders, and improve employee conditions, and energy efficiency.

After barrels are assembled and toasted, coopers now roll them to a gravity-flow cooling rack, positioned above a cool concrete floor, and leading barrels to a croizing machine. After head grooves are cut, barrels are positioned on another new set of rails for drilling and cauterizing of bung holes.

"Our layout allows 'flow manufacturing,' versus previous 'batch manufacturing,' increasing capacity 20% during busy periods, with the same staff," explains Lance Spears, U.S. president/CEO. "It gives increased flexibility and responsiveness to more closely match demand-cycles from wineries."

To maintain stave and barrel inventory at the cooperage, Seguin Moreau invested $100,000 of its upgrade budget on a new return-airflow system and swamp coolers on the building roof.

"The plant was originally built with a vacuum system, but we were not getting enough return-airflow," Spears adds. "Now we've got dramatically better airflow, great for reducing ambient dust particles."

Seguin Moreau Napa Cooperage Inc. and its parent company, Seguin Moreau (France), are both cooperage divisions of wine supplier Oeneo, which is striving for more environmentally sustainable business practices in all of its divisions. Seguin Moreau France has recently earned Programme for the Endorsement of Forest Certification (PEFC) as sustainable forestry managers, and the right to use the PEFC logo on their French oak barrels.

PEFC is the world's largest forest certification system. Seguin Moreau had to show that it practiced responsible procurement of wood-based materials from sustainably-managed forests. The cooperage and its European forest sources will be routinely reporting to, and audited by, PEFC to maintain future certification.

The company hopes to achieve and maintain PEFC certification (or its U.S. equivalent) at its American forestry sources. ■

# Old Vine Zinfandel clone tested and available for planting

Sunridge Nurseries released Zinfandel Clone 8 (also called Old Clone Zinfandel and the Bisordi Lane Clone) to grapegrowers in March 2005. Sourced from 100 year-old Zinfandel vines near Fulton, CA in 1995 by grower Bob Dempel, Clone 8 was placed into the Foundation Plant Service (FPS) testing program to earn disease-free certification.

Once the cuttings were FPS-certified, Dempel grafted them to 101-14 and 110R rootstock on two acres in Ukiah, CA. Vine spacing is 6 x 10 feet; elevation 700 to 800 feet, and the soil is shallow and gravelly.

Clone 8 is known for small clusters and berry size, which yield deep color, brambly berry, spice and pepper flavors, and rich texture, according to Dempel.

Vines began bearing in 2002; were harvested in 2003 (1.5 tons at 28º Brix) and the fruit was sent to Paradise Ridge Winery (Santa Rosa, CA) for winemaker Dan Barwick's use. The grapes were destemmed, keeping whole berries as much as possible, and cold-soaked for several days. Grapes were inoculated with yeast, then cool-fermented in one-ton bins with a submerged cap, and pumped-over once a day.

Barwick produced one barrel (20 cases) for use by Dempel and Sunridge Nurseries. Bottled in September 2004, the Zinfandel was sent to Vinquiry for lab analysis. Vinquiry reports alcohol of 16.43%; 3.64 pH; 0.73g/100ml TA; free $SO_2$ of 3 mg/l and total $SO_2$ of 43 mg/l; and VA of 0.056g/100ml.

For more information about purchasing the clone from nursery stock, contact Sunridge Nurseries, Bakersfield, CA, at 661/363-8463. For information about certification or growing conditions for the test clone, contact Dempel Farming Company, Santa Rosa, CA at 707/545-2310.

# Modern wine pioneers in cold climates

In February, 2005, I had the pleasure to speak at the Cold Climate Grape and Wine Conference in Rochester, MN. Organized by the Minnesota Grape Growers Association (MGGA), the conference was the first of its type, replacing the previous "Spring Symposium."

The MGGA has operated since 1976 to support cold climate viticulture, and neighboring cold climate states also benefit from its work. Temperatures in the midwest and some other eastern states can drop to –30ºF or lower, and winter survival of vines is a major issue for development of the industry.

One highlight of the conference was a memorial banquet for Elmer Swenson, revered as "father of cold climate viticulture," and a pioneer grape breeder.

I had visited Nebraska the previous year, and was familiar with some of the issues of grapegrowing in these cold-climate regions. By west coast standards, midwestern vineyards are typically very small. Many vignerons are new to the business. I also learned of the work of many private and university grape breeders. Unlike the western part of the U.S., the wine business in the midwest is dependent on finding new varieties which can tolerate winter freeze and produce desirable wine style.

In this column I will address the symposium content and the work of vine breeders in the region.

### Cold Climate Symposium

The symposium was attended by almost 300 people, mostly current or aspiring vignerons from Minnesota, but also from surrounding states (North Dakota and South Dakota, Iowa, Wisconsin, Illinois, New York, Montana, Vermont, North Carolina, and Maine). The program extended over 1½ days, and included a trade show and banquet.

The first afternoon was educational, with experienced growers offering tips to those planning to enter the industry. (There seemed to be plenty of the latter. This did not surprise me, given the area's relative proximity to wine markets.) As is common in cold climates, there was great emphasis on site selection and minimizing winter freeze damage.

A winemaker roundtable presented varietal wines of Lacrosse, Foch, Frontenac, and late harvest St. Pepin, and discussed common problems with their handling in the cellars. I was impressed with many of the wines and the technical knowledge of the vignerons. This bodes well for winemaking faults not hindering development of these new industries, as has happened elsewhere.

There were interesting addresses on Asian Lady beetles, about which I will write more in future columns. Kristofer Sperry spoke of winery design that minimizes impact on the environment, and Dr. Paul Read of Nebraska addressed minimizing cold damage to vineyards.

A highlight of the conference for me were the two presentations by French-born Philippe Coquard of Wollersheim Winery, Prairie du Sac, WI. This vineyard site was originally chosen and planted in the 1840s by Count Haraszthy, who was to subsequently found the California wine industry. Now the business is run by the Wollersheim family, and son-in-law Philippe provides technical expertise.

There are 23 acres of vineyard on the site. Foch is the main grape variety, from which *five* wine styles are bottled! Total production is 165,000 gallons. Philippe told how commitment to quality and attention to detail in the vineyard and winery were the keys to commercial success.

### Honoring Elmer Swenson

I have previously written in this column (*PWV*, January/February 2001) about the achievements of T.V. Munson, the Texas nurseryman and grape breeder who is credited with saving the French wine industry from phylloxera. He also played an important, though indirect, role in the midwest wine industry.

As a 5-year old, Wisconsin farm boy Elmer Swenson was shown Munson's book, "Foundation of American Grape Culture," by a school teacher who boarded with his family. His grandfather was a fruit hobbyist, and these influences launched Elmer's life-long interest in breeding grapevines.

Commencing in 1943, Swenson pursued that interest part-time in addition to his traditional farming activities. He recognized that local Riparia varieties tolerated extreme cold, so he crossed them with French hybrids. While most professionals ignored Swenson, Richard Wellington of Cornell's Experiment Station (Geneva, NY) encouraged his pursuits, even providing pollen.

Gradually, word of Swenson's work spread, and he was offered a job on the Research Centre farm of the University of Minnesota. Here, he was able to continue his breeding, releasing his first two hybrids, Edelweiss (named by a New Hampshire hobbyist) and a Swenson Red table grape, jointly with the university.

Swenson continued grape breeding on his home farm up until his death at the family homestead in December, 2004 at age 91. By then he had made many crosses and had a vineyard with thousands of seedling vines. He named at least 18 varieties which are planted in the U.S., Europe, and Asia.

The symposium banquet in honor of Elmer was very moving. The audience was told of a very special person and a clever and dedicated grape breeder by two of his protégés, Tom Plocher and Mark Hart. Swenson was widely known for his patience, kindness, generosity, and dedication to family. Many at the symposium shared memories of special moments with Elmer, particularly of walking around his vineyard while he held forth from memory on each of the thousands of selections. There is now a project to conserve these seedlings.

There are now a group of dedicated vine-breeders in the region, including those at the University of Minnesota, and I will report on them in a future column. For now, suffice to say that the pioneering wine industry of the midwest has many varieties to choose from. They are winter-hardy and often disease-resistant, and make fine wines. A few deserve special mention.

There is the excellent red variety Frontenac from the University of Minnesota, and a newly discovered mutant

**Elmer Swenson and Meeri Saario, a fruit researcher from Helsinki University, Finland, circa 1996. (Modern wine pioneers.doc)**

Frontenac Gris (note neither are related to the vinifera Frontignac). Prairie Star and Louise Swenson are two notable whites. For a discussion of varieties and cold climate viticulture, I suggest the book "Northern Winework" (www.northernwinework.com) by Tom Plocher and Bob Parke.

### *Creating an industry*

In my opinion, the U.S. has the most interesting wine industry in the world. Why? It is not solely due to the vinifera-based wine sector on the west coast, but also to the rich diversity of native grape species. The modern-day pioneers of the midwest are using these native grapes to create their own industry where none existed before. Thanks go to a dedicated group of grape breeders like Elmer Swenson who have added to the rich heritage of America's wine industry. ■

*Dr. Richard Smart, desk phone: 03-6394-1116, cell phone: 0418-656-480, residence: 03-6334-8838, fax: 03-6331-0849, email to: vinedoctor@compuserve.com, website: www.smartvit.com.au, or mail to: PO Box 350, Newstead, Tasmania 7250, residential: 71 Lyttleton St. East Launceston, Tasmania.*

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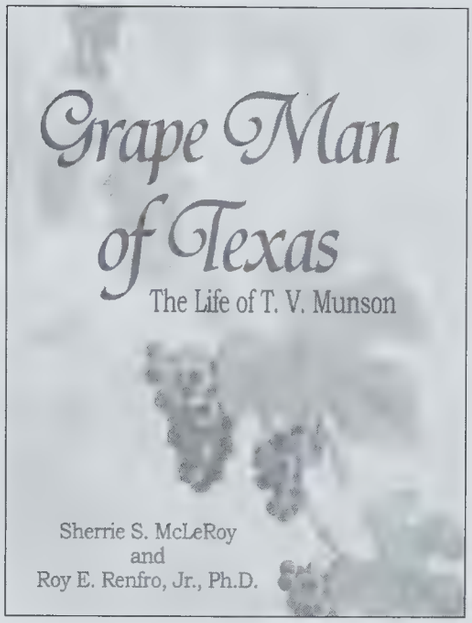
## MUNSON'S LEGACY

# Foundations of American grape culture




Thomas Volney Munson had dreamed, for years, of writing the definitive book on the American grape. He had put aside his own plans for publishing to accept just such a commission from the U.S. Department of Agriculture (USDA), but that massive, illustrated tome never came to fruition, due to lack of funding. Now, in the waning years of his life, Munson once more turned his attention to the book that would incorporate his research, experience, and knowledge."

In 1907, he began to write, pulling together decades of field notes, correspondence with other horticulturists and viticulturists, and, probably, his unpublished draft manuscript for the USDA. He also selected almost 90 life-size halftone engravings of grapes and their components taken by Denison photographer G.W. Moore. Daughter Viala, then 19 and home from college for the summer, painstakingly typed all the material into book form, 252 pages in length."

In October of that same year, Munson traveled to New York City — to seek a publisher for his book manuscript, *Foundations of American Grape Culture*. In an article written a few years later, Munson recalled that "the 'panic' was coming on and I found no publisher willing to undertake the job."

With "the assistance of my able son, Will B. Munson," Munson finally decided to publish the book himself, "if 1,000 subscribers can be obtained" to offset the cost of printing. In *The National Nurseryman*, he described the planned work: "The first edition will be an autograph edition, with good recent photo-engraving of the author. The printing will be on 100 pound coated book paper, bound in buckram [a stiffly finished cotton or linen], gold lettering on back and cover, delivered cost about what we ask for it, $3."

The preface briefly and modestly described Munson's career; except for his listing the Legion of Honor on the title page, for example, there was no description or even mention within the text of his work with (French viticulturists) Viala, Planchon, et al (to combat phylloxera).

Chapter 1 presented the botany of the American grape and Volney's own classification of 26 American and two foreign species, while directions for breeding and hybridizing them were covered in Chapter II. Next came a listing of varieties, followed by Munson's assessment of the adaptability of each to various regions, which he candidly described as "one of the most valuable pieces of grape literature ever presented."

Chapters V through VIII gave a succinct presentation on growing and marketing grapes as well as their value for adornment around the house. The book concluded with several indices to photographs, varieties, topics, and tables.

*Foundations* was released in the fall of 1909 to positive reviews. *Science*, for example, published a four-column review ... (that) called the book a "veritable boon" for grape-growers. It was (the reviewer's) further opinion that *Foundations* "must long be regarded as a model of its kind," advancing grape experimentation in the United States by a quarter of a century.

Other horticulturists and vineyardists throughout the country hastened to add their testimonials ... Munson's old friend H.E. Van Deman declared the pomological world "deeply indebted" to him. Another old friend, Liberty Hyde Bailey of Cornell, later characterized it as the "faithful work of a lifetime."

After his death, it would be reprinted five more times. The most recent reprint was done by the Munson Viticulture Center and the (W.B.) Munson Foundation in 2001. Because of its classic nature and value to grapegrowers, *Foundations of American Grape Culture* remains in print and in demand today. ■

*Excerpted with Author's permission from* Grape Man of Texas; The Life of T.V. Munson, *by Sherrie S. McLeRoy, Roy E. Renfro, Jr., Ph.D. The book is available from the* ***PWV*** **Bookshelf** *for $39.95.*

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PERSONNEL POINT OF VIEW *by Anne Heron*

# *Can you hear me now?*

"My staff gave me some tough marks," Judy was looking over the results of a recent employee opinion survey. "They say I don't listen very well. I know what they must be experiencing. When I'm on the run, it's hard for me to pay attention. Sometimes I let my own opinions get in the way! Can you give me some pointers on how to improve?"

"You're not alone, Judy" I replied. "Listening skills are something that we often take for granted. We do it every day, so we think we must be good at it! When we're conducting manager-training sessions, we cover some tips that might help you."

**LISTEN ATTENTIVELY WITHOUT INTERRUPTING.** This seems so basic, but it's something that we need to remember. Often, we are so busy evaluating and judging what's being said, or preparing our own rebuttal, that we don't concentrate on what the person is saying. We need to give up judging, expecting, assuming that we already know what the speaker will say.

Judy nodded. "I need to slow down and stay present — really hear the message and try to understand why it's important to the speaker. I've also noticed that I need to pay attention with my eyes *and* with my ears." I agreed. Body language may convey additional meaning to the conversation. What is the speaker's tone of voice? What's their facial expression? Do they look tense? Relaxed?

**MAKE A CONSCIOUS CHOICE ABOUT YOUR RESPONSE.** Words, issues, situations, and/or personalities trigger us emotionally. When our "hot buttons" are activated, we may tune out, pre-judge messages or even dismiss the messenger. If you want to be effective at listening, you need to control your emotional "hot buttons" and think before you reply.

"I used to have trouble with this one," Judy explained, "until I learned a trick to buy time. Now when I feel the heat rising, I reply 'That's interesting, tell me more about it.' This gives me the few minutes I need to get myself calmed down. It also gives me more information and sometimes what I hear takes away my concerns."

**ACKNOWLEDGE THE OTHER PERSON'S FEELINGS.** It's important to listen for the speaker's emotional meaning and the subject matter content of the message. This can be tough in a business setting. We want everything to run smoothly and have everyone "get along," "be calm," "put a smile on." However, we're all human beings, and part of being human is to have feelings. If you want people to feel heard, you must make it okay for them to express their feelings, even when they are angry or frustrated.

"How do you do this?" Judy asked. "There are several things that are effective," I noted. "When you want to convey a positive, encouraging attitude, respond with a smile, nod, or a word of acknowledgment as the speaker is talking. You could also use empathy and say something to let speakers know that you recognize their feelings, such as 'It sounds like you're concerned about this' or 'It sounds like this situation is frustrating for you.'"

**ASK OBJECTIVE QUESTIONS FOR CLARIFICATION.** As a listener, you'll want to evaluate the message, but not prematurely. Once you start evaluating, you'll be formulating your own ideas instead of listening to the speaker. However, when the speaker is done, you can begin to clarify what you've heard to be sure you understand and can base your response and opinion on all available information.

"I usually make assumptions about what people are saying," Judy admitted. "I think I know most everything that's going on, and I'm often rushing to get on to the next thing. I just want to 'cut to the chase' in the conversation!"

"You're not alone," I acknowledged. "But asking questions, especially open-ended questions, encourages information-sharing and new ideas. It also lets the speaker know that you are interested in understanding what they're saying. You might ask: 'Could you clarify this for me?' or 'Could you please repeat that?' or 'I'm not sure I've got it. Could we go over that again?'"

**TRY TO SEE THE OTHER PERSON'S VIEWPOINT.** This is a tough one, especially when we have a strong opinion about the subject under discussion. Try to stand in their shoes without making value judgments. Ask yourself what their needs are in this situation. Why are they reacting this way? You might ask them: "How did this affect you?" or "What do you need?" or "What would you like to see happen here?" or "What approach would you take?"

Judy was taking notes. "When employees bring problems to my attention, I get so wrapped up in solving them that I often don't take time to understand it from their perspective. I can see how asking these questions could have an added benefit of helping them come up with the solution themselves!"

"Listening to problems is a real challenge," I agreed. We discussed the patience it takes to problem-solve effectively. The best solutions aren't always the immediate ones. It's important to be patient with the other person and yourself. If a solution can't be reached then, schedule another time to meet and take time to think about the situation.

**EXPRESS YOUR VIEWPOINT.** Good listening means giving the speaker an appropriate response, verbally and/or nonverbally. "I thought you'd never get here!" Judy exclaimed. "This is my favorite part of any conversation!" I smiled. Judy is a very persuasive speaker, and we talked about the fine art of presenting your opinion without making the other person defensive or forcing them to prove their point.

Judy became thoughtful, "What can I say if I don't agree with their concerns? I don't want to shut down conversation, or their suggestions, but I can't always do what employees want me to do."

"Good listening doesn't mean agreeing with what the speaker is saying. However, it does require acknowledgement of the speaker's opinions, and a response that let's them know you've considered what they had to say. You might

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reply: 'I appreciate your feedback; I'll take that into consideration next time,' or 'Thanks for your perspective. Here's what I'm thinking.' It's helpful to explain why you feel the way you do. A reasonable explanation can often diffuse an emotional issue. You may have information that the speaker does not, and sharing it might help them to understand your conclusions."

Judy smiled. "I've got lots of good ideas to work with here. I can't wait to practice them with my staff!"

Six weeks later, Judy called again. "I asked for more feedback from my staff," She sounded excited and happy. "They've given me a 'thumbs up' in communication. They feel that I'm listening to them now and that I'm concerned about what they have to say. For my part, I'm hearing ideas and solutions from them that I've never heard before. It's like we're a real team! I'm so glad I listened to their feedback in the first place."

I smiled. "You know Judy; I came across a quotation from Winston Churchill the other day that really sums it up for me. He said, 'Courage is what it takes to stand up and speak; courage is also what it takes to sit down and listen.'" ■

*Anne Heron is a Senior Associate with The Personnel Perspective, a human resources consulting, training, and recruiting firm in Santa Rosa, CA. Anne has over 25 years of management and HR experience. You can contact her at 707/576-7653.*

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## INDEX TO ADVERTISERS

| ADVERTISER | PAGE | PHONE | FAX | CONTACT |
|---|---|---|---|---|
| Agajanian Vineyards | 82 | 707/433-6654 | 707/433-6684 | Gary Agajanian |
| Agri-Analysis Associates | 38 | 530/757-4656 | 530/757-4655 | K. Friebertshauser |
| Agro-K Corporation | 11 | 800/328-2418 | | Dennis Culver |
| Akeena Solar | 8 | 408/395-7774 | 408/395-7979 | Wahila Minshall |
| American Ag Credit | 19 | 800/800-4865 | 707/545-9400 | Terry Lindley |
| Amorim Cork America | 33 | 707/224-6000 | 707/224-7616 | Daryl Eklund |
| AROL USA | 18 | 678/318-1290 | 678/318-1296 | Richard Cabori |
| ARS/Pressure Washer Co. | 66 | 707/942-8330 | 707/942-8337 | Glenn Caster |
| ATAGO USA, Inc. | 62 | 425/637-2107 | 425/637-2110 | Frank Young |
| Barrel Builders | 30 | 800/365-8231 | 707/942-5426 | Phil Burton |
| BASF Corp. | 25 | 973/245-6379 | | Jason Asche |
| Bird Gard, LLC | 63 | 888/332-2328 | 541/549-5286 | Terry Denzer |
| Boswell Company | 9, 82 | 415/457-3955 | 415/457-0304 | Jim Boswell |
| BPM Minerals | 8 | 281/871-7900 | 281/871-7940 | Don Schulthess |
| Joseph W. Ciatti Company | 27 | 415/458-5150 | 415/458-5160 | Joseph Ciatti |
| Canton Cooperage | 32 | 707/836-9742 | 707/836-9759 | Brian Geager |
| ColloPack Solutions | 43 | 707/258-3940 | 707/258-3949 | Greg Fulford |
| Cork Supply USA | 2 | 800/961-2000 | 707/746-7471 | James Herwatt |
| Criveller Company | 66 | 905/357-2930 | 905/374-2930 | Bruno Criveller |
| Duarte Nursery | 55 | 800/GRAFTED | 209/531-0352 | John Duarte |
| Encore! | 56 | 510/234-5670 | 510/234-0433 | John First |
| Engelhard Corp. | 41 | 732/205-5000 | | John Mosko |
| eSkye Software | 48 | 707/996-9754 | 707/996-5509 | Bronwen Carlin |
| Euro-Machines, Inc. | 39 | 707/864-5800 | 707/864-5879 | Matt Eiser |
| Fogmaster | 63 | 954/481-9975 | 954/480-8563 | Tom Latta |
| Glass Pak Filtration Products | 59 | 707/207-0400 | 707/207-0900 | Dallas Nelson |
| Gordon Graphics | 35 | 415/883-0455 | 415/883-5124 | G. Lindstrom |
| Government Liaison Services | 60 | 800/642-6564 | 703/525-8451 | James Hurson |
| GroWonders Corp. | 22 | 718/321-0440 | 775/685-9220 | Cheng Wu |
| Gusmer Enterprises | 65 | 559/485-2692 | 559/485-4254 | Roger Pachelbel |
| Hall & Bartley | 67 | 707/544-1642 | 707/544-1646 | Andy Hall |
| Hoyt Shepston, Inc. | 83 | 650/952-6930 | 650/952-5691 | Fred Hosking |
| Innerstave | 45 | 707/996-8781 | 707/996-1157 | Philippe Michel |
| International Specialty Products | 87 | 973/872-4403 | 973/628-3886 | Mustafa Rehmanji |
| Jaybird Manufacturing | 64 | 888/889-4407 | 814/235-1827 | Sales Department |
| JWB Marketing/Bird Gard | 29, 60 | 800/555-9634 | 201/666-7581 | Jim Burton |
| Kasco Marine, Inc. | 59 | 715/262-4488 | 715/262-4487 | Bob Robinson |
| GW Kent | 7 | 800/333-4288 | 734/572-0097 | Chantal Reichwage |
| Kimco Manufacturing | 86 | 800/356-9641 | 209/277-9358 | Kim Welker |
| Knox Industries | 10 | 415/751-6306 | 415/221-5873 | Mel Knox |
| Lallemand | 24 | 707/526-9809 | 707/526-9803 | Gordon Specht |
| Maurivin Yeast | 52 | 559/268-4571 | 559/268-0619 | Ozzie Bates |
| Mercier USA | 34 | 707/251-5818 | 707/251-5811 | Krimo Souilah |
| Monarch Manufacturing | 5 | 800/284-0390 | 719/539-3900 | Zach Zeiset |
| Nadalié USA | 85 | 707/942-9301 | 707/942-5037 | Duane Wall |
| Napa Fermentation Supplies | 54 | 707/255-6372 | 707/255-6462 | Pat Watkins |
| P&L Specialties | 51 | 888/313-7947 | 707/573-3140 | Steve Eckles |
| Pickering Winery Supply | 57 | 415/474-1588 | 415/474-1617 | John Pickering |
| Premier Power | 47 | 877/939-0400 | 916/939-0490 | Deborah Millhollin |
| Ramondin USA | 3 | 707/944-2277 | 707/257-1408 | Melinda Elledge |
| Refrigeration Technologies, Inc. | 34 | 800/834-2232 | 707/987-4581 | Glen Marks |
| REO*TEMP* Instruments Corp. | 54 | 800/648-7737 | 858/784-0720 | Sales Department |
| Rivercap USA | 46 | 707/747-3630 | 707/746-7471 | Jeremy Bell |
| RLS Equipment Co. | 80 | 609/965-0074 | 609/965-2509 | B. Stollenwerk |
| Saint-Gobain Containers | 17 | 800/428-8642 | 765/741-7012 | Marilyn LaGrange |
| St. Patrick's of Texas | 58 | 512/989-9727 | 512/989-8982 | Lynne O'Connor |
| Saverglass | 21 | 707/259-2930 | 707/259-2933 | Erica Harrop |
| Savour Oak | 42 | 707/746-5704 | 707/746-7471 | Ron Varner |
| Scott Laboratories | 62, 86 | 707/765-6666 | 707/765-6674 | Steve Doherty |
| SPEC Trellising | 22 | 800/237-4594 | 215/357-3122 | Michael Schmidt |
| Spurgeon Painting, Inc. | 26 | 707/763-7185 | 707/763-5659 | Karen Spurgeon |
| Star Filters Division | 20 | 607/733-7121 | 607/737-1108 | Mark Rose |
| StaVin, Inc. | 37 | 415/331-7849 | 415/331-0516 | Alan Sullivan |
| Sterling Insectary | 29 | 661/201-3677 | 661/792-6880 | Kim Gallagher |
| Stoel Rives | 55 | 415/617-8925 | | Christopher J. Carr |
| Sunridge Nurseries | 57 | 661/363-8463 | 661/366-4251 | Terrie Stoller |
| TCW/The Compleat Winemaker | 67 | 707/963-9681 | 707/963-7739 | Sales Department |
| Tonnellerie Boutes | 28 | 510/799-1518 | 510/799-1557 | Manny Martinez |
| Tonnellerie Quintessence | 53 | 707/935-3452 | 707/935-3422 | Brian Hartley |
| Tonnellerie Saury | 48 | 707/944-1330 | 707/944-1370 | Bayard Fox |
| Vinquiry | 51 | 707/838-6312 | 707/838-1765 | Sales Department |
| Vintage Nurseries | 82 | 800/499-9019 | 805/758-4999 | Jeff Sanders |
| Vogelsang Wine Pump Division | 12 | 800/984-9400 | 330/296-4113 | Sales Department |
| Weed Badger | 14 | 701/778-7511 | 701/778-7501 | Jeffrey Anderson |
| Western Square Industries | 49 | 209/944-0921 | 209/944-0934 | John Peter |
| Westfalia Separator | 88 | 201/767-3900 | | Mike Hoer |
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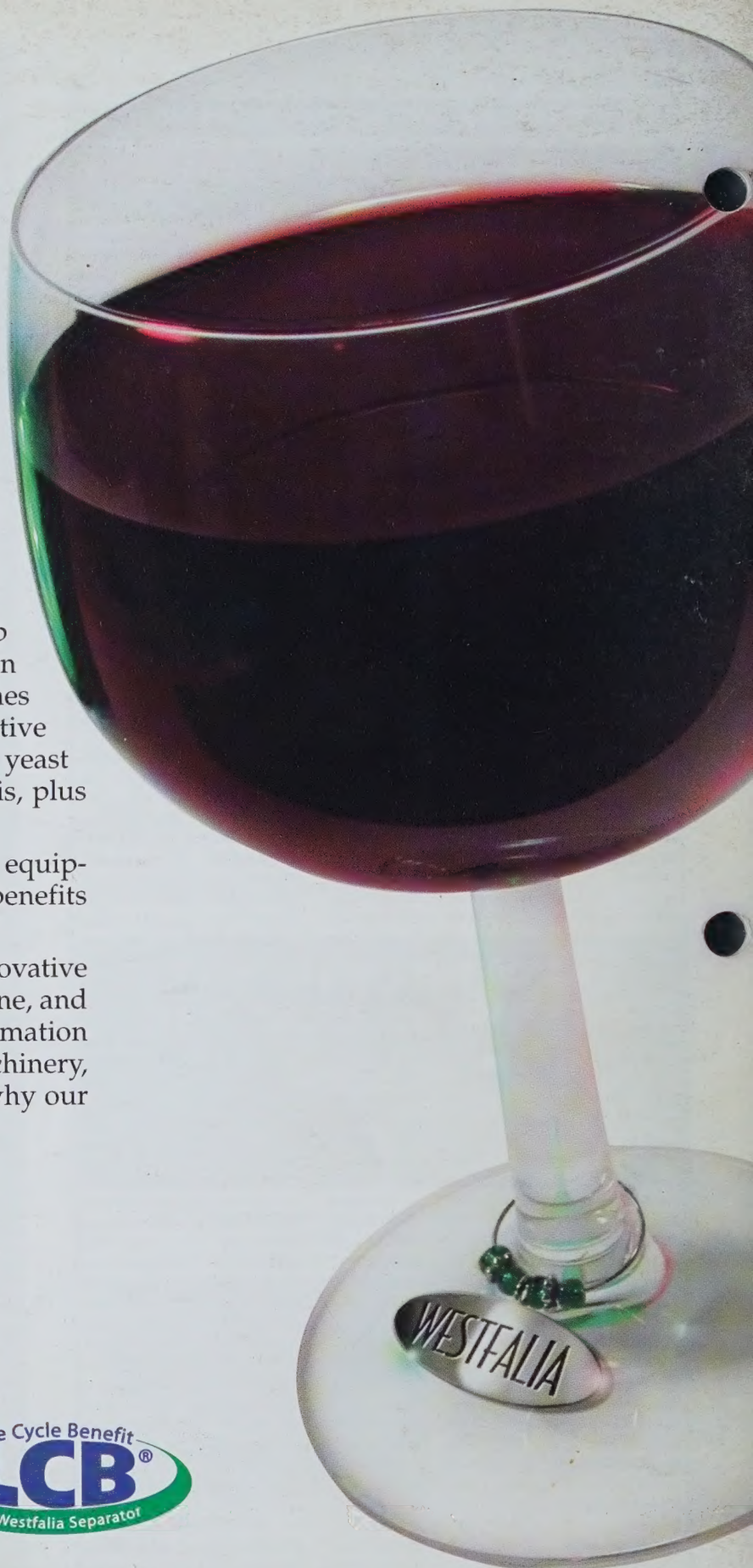


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